EPA600/R-20/274
August, 2020

United States
Environmental Protection
Agency

Development of a Cumulative Resilience Screening Index (CRSI) for Natural Hazards: An Assessment of Resilience to Acute Meteorological Events and Selected Natural Hazards

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Development of a Cumulative Resilience Screening Index (CRSI) for Natural Hazards: An Assessment of Resilience to Acute Meteorological Events and Selected Natural Hazards

by
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Acronyms and Abbreviations

BRIC	Baseline Resilience Indicators for Communities
CBNRM	Community-Based Natural Resource Management
CDRI1	Climate Disaster Resilience Index 1
CDRI2	Climate Disaster Resilience Index 2
CEQ	Council on Environmental Quality
CRS	Community Rating System
CRSI	Cumulative Resilience Screening Index
CWPPRA	Coastal, Wetlands Planning, Protection and Restoration Act
DOC	Department of Commerce
DOI	Department of the Interior
EPA/USEPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GAO	Government Accounting Office
ICLEI	Local Governments for Sustainability (previously the International Council for Local Environmental Initiatives)
LUST	Leaking Underground Storage Tanks
M-CRD	Metrics for Community Resilience to Disaster
MERLIN-RC	Model for External Reliance of Localities In Regional Contexts
M-RD	Metrics for Resilience to Disaster
NCA	National Climate Assessment
NHEERL	National Health and Environmental Effect Research Laboratory
NFIP	National Flood Insurance Program
NGO	Non-Government Organization
NRC	National Research Council
NRCS	National Resource Conservation Service
OECD	Organization for Economic Co-Operation and Development
OMB	Office of Management and Budget
PCA	Principal Components Analysis
PRISM	Patterns of Risk using an Integrated Spatial Multi-Hazard Model
RC4A	Resilient Communities for America
RCRA	Resource Conservation and Recovery Act
SBA	Small Business Administration
SHC	Sustainable and Healthy Communities Research Program
SHELDUS	Spatial Hazard Events and Losses Database
SOVI	Social Vulnerability Index
TRI	Toxic Resource Inventory
USFS	United States Forest Service
USGS	United States Geological Survey

Acknowledgments

The authors would like to thank the peer reviewers of this report:
Courtney G. Flint, Ph.D., Professor of Natural Resource Sociology, Dept. of Sociology, Social Work and Anthropology, Utah State University
Peter B. Meyer, Ph.D., Professor Emeritus of Urban Policy and Economics, University of Louisville, President and Chief Economist, The E.P. Systems Group, Inc.
Matthew Nicholson, EPA Region 3
Meaghan Bresnahan, EPA Region 6, Unable to Complete due to Hurricane Harvey
Adele Cardenas Malott, EPA Region 6
Suzanna Perea, EPA Region 6
Joyce Stubblefield, EPA Region 6
Laura J. Farris, Climate Change Coordinator and International Coordinator, EPA Region 8
Bruce Duncan, Regional Science Liaison to Office of Research and Development, EPA Region 10
Jeff Peterson, Senior Policy Advisor, EPA Office of Water
Megan Susman, EPA Office of Sustainable Communities
Dana Krishland, EPA Office of Air and Radiation
Emma Zinsmeister, EPA Office of Air and Radiation

Additionally, the authors would like to thank Ms. Virginia Houk of the National Health and Environmental Effects Research Laboratory for organizing and conducting the peer review.

Executive Summary

This 2019 revision research report, Development of a Cumulative Resilience Screening Index (CRSI) for Natural Hazards: An Assessment of Resilience to Acute Meteorological Events and Selected Natural Hazards is a revision of the original 2017 report: Development of a Climate Resilience Screening Index (CRSI): An Assessment of Resilience to Acute Meteorological Events and Selected Natural Hazards (Summers et al. 2017). This revised report is a synthesis report detailing research in the development and demonstration of the CRSI approach at both the national and regional scales using county data, primarily changes the name associated with acronym CRSI, and updates some information associated with indicator calculations. The revised report still includes an extensive analysis of the conceptual framework along with methods for metric, indicator and domain calculation.

Natural disasters often impose significant and long-lasting stress on financial, social and ecological systems. From Atlantic hurricanes to Midwest tornadoes to Western wildfires, no corner of the U.S. is immune from the threat of a devastating natural hazard-event. Across the nation, there is a recognition that the benefits of creating environments resilient to adverse natural hazard events helps promote and sustain county and community success over time. The challenge for communities is in finding ways to balance the need to preserve the socio-ecological systems on which they depend in the face of constantly changing natural hazard threats.

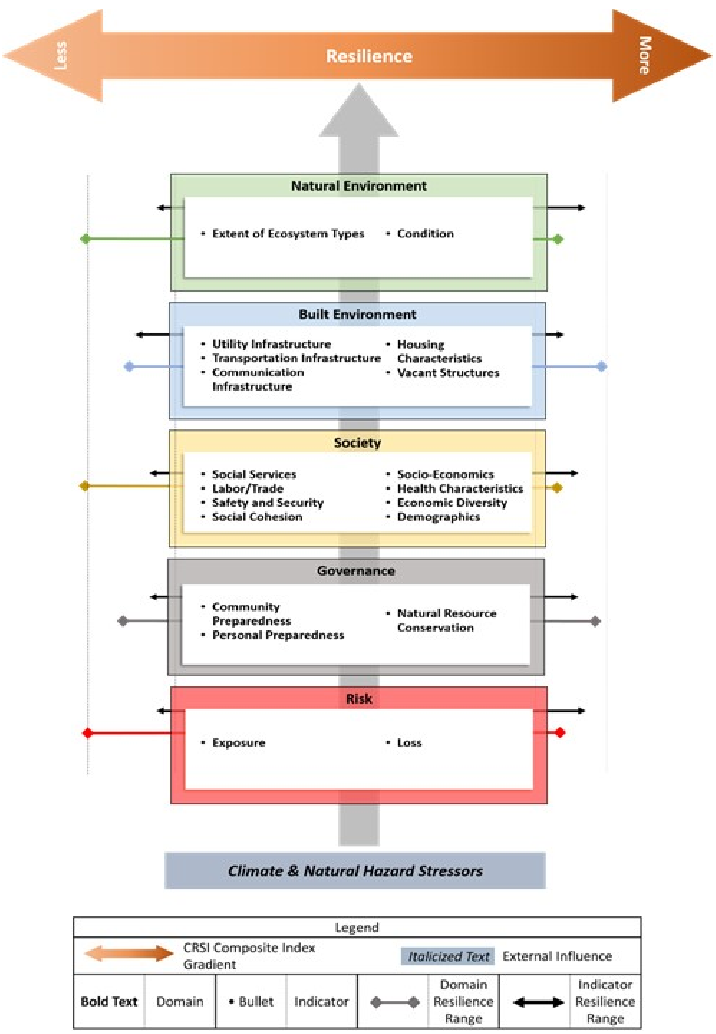


Figure E-1. Conceptual representation of the Cumulative Resilience Screening Index (CRSI) Approach

The Cumulative Resilience Screening Index (CRSI) has been developed as an endpoint for characterizing county and community resilience outcomes that are based on risk profiles and responsive to changes in governance, societal, built and natural system characteristics. The Cumulative Resilience Screening Index (CRSI) framework (Figure E-1) serves as a conceptual roadmap showing how acute natural hazard events impact resilience after factoring in the county and community characteristics. By evaluating the factors that influence vulnerability and recoverability, an estimation of resilience can quantify how changes in these characteristics will impact resilience given specific hazard profiles. Ultimately, this knowledge will help communities identify potential areas to target for increasing resilience to acute natural hazard events (Figure E-2).

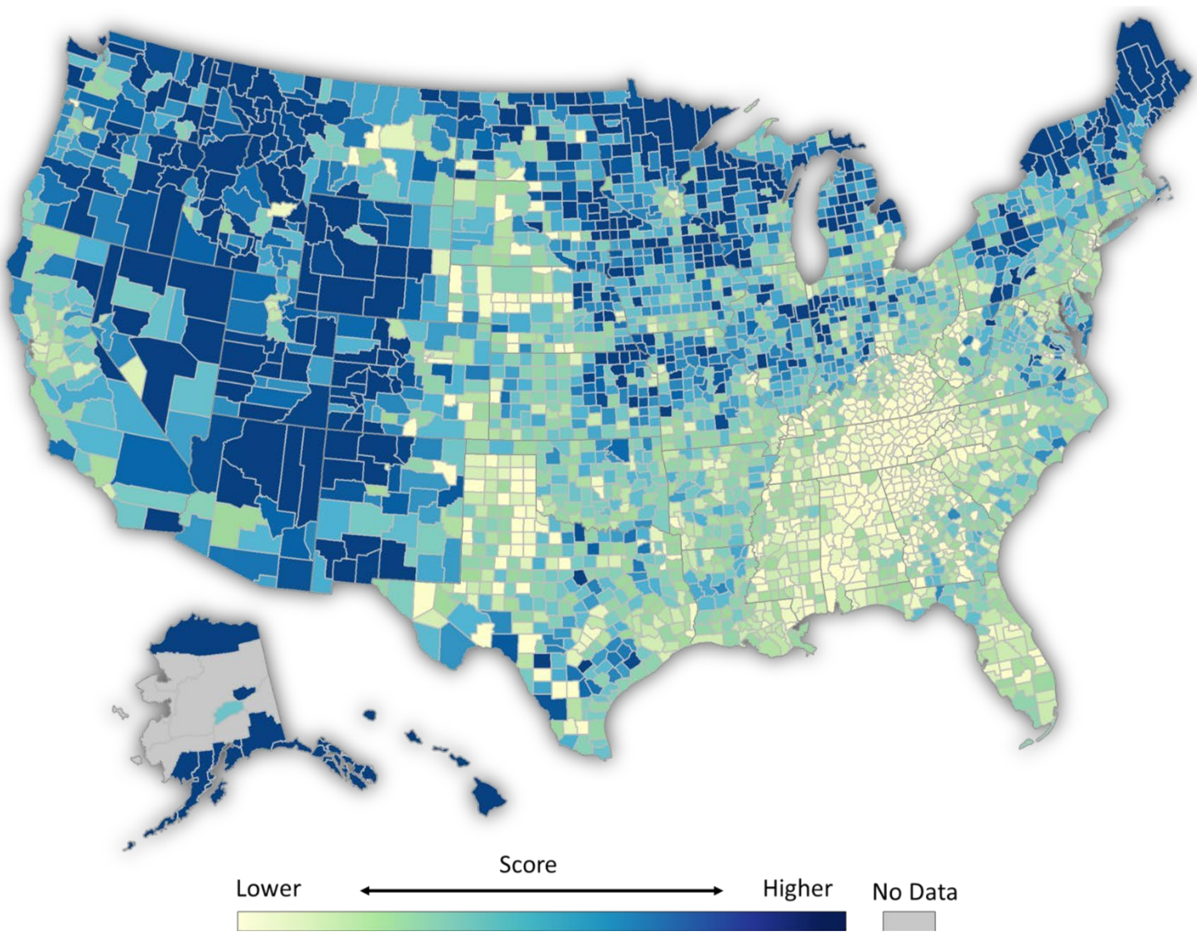


Figure E-2. Map showing distribution of final CRSI Scores across the U.S. (2000-2015). Darker colors indicate higher resilience scores; lighter colors indicate lower resilience scores.

The index is a composite measure comprised of five domains (Risk, Governance, Society, Built Environment, and Natural Environment), represented by 20 indicators, calculated from 117 metrics. CRSI scores have been calculated at the county level (or parish or borough) and community resilience, and additional break out assessments are presented for individual domains of the index as well as regional level as a composite for the years 2000-2015 (Figure E-3). In addition, to a national assessment of resilience, EPA regional and county measured are calculated and mapped.

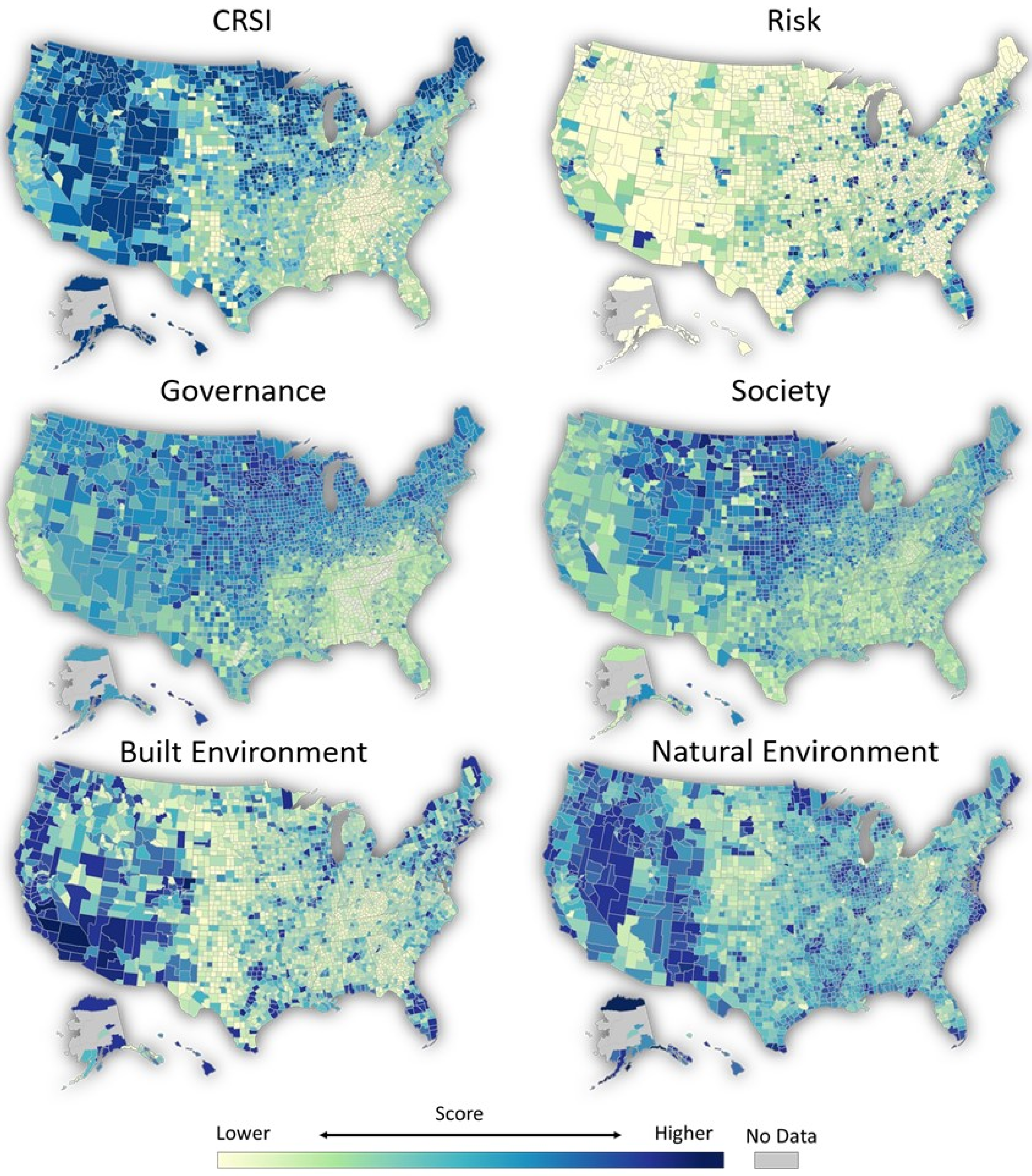


Figure E-3 The distribution of CSRI values and domain scores (Risk, Governance, Society, Built Environmental, and Natural Environmental)

Regional analyses characterize risk components, evaluate relative domain contributions to resilience, and delineate indicator contributions within the geography. Polar plots are utilized as a method to easily discern indicator influence (Figure E-4).

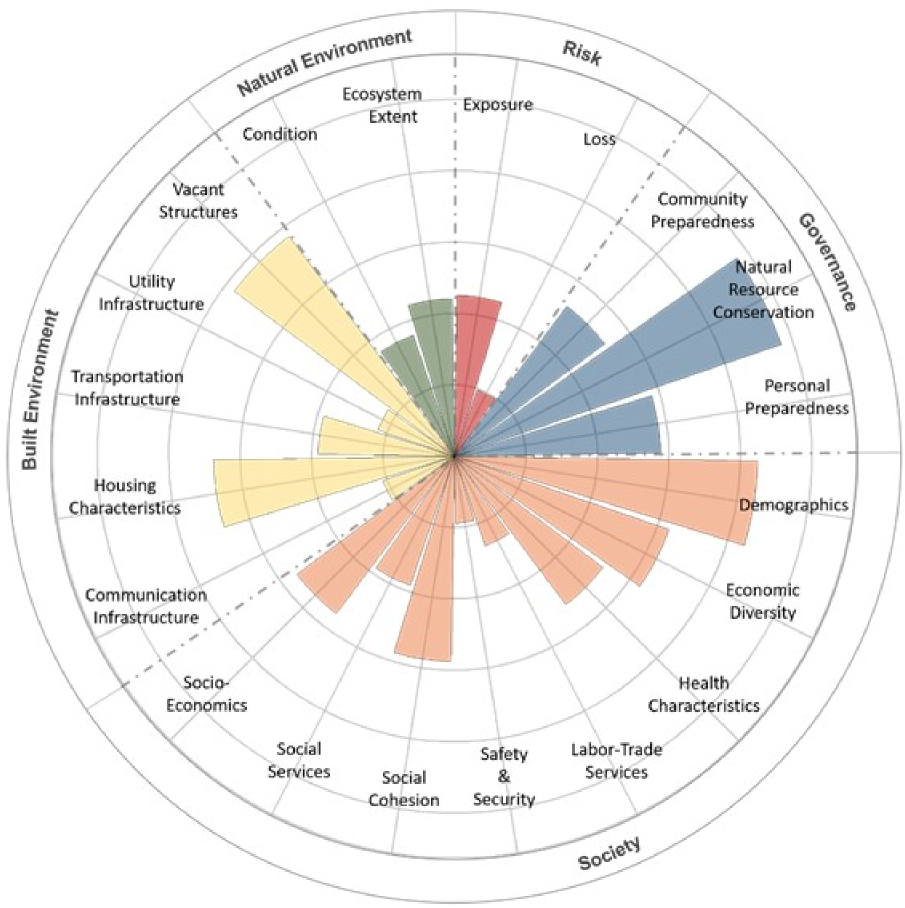


Figure E-4. Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 5. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

CRSI was developed with input from EPA Regional Climate Coordinators and ORD Regional Science Liaisons. The demonstration results by county and by EPA region can be used by the Regions to engage communities in resilience discussions, be vetted with local knowledge and potentially be used to target resources for improving resilience. CRSI results data, like EQI and HWBI results can be made available through the Geoplatform for use in SHC tools. Overall CRSI values, and domain scores at the county-level can inform sustainability assessments research (4.61) and could complement vulnerability assessments for developing resilience strategies (e.g., developing water resilience strategy for Merrimack River, Lawrence, MA (SHC 2.62)).

'Your effort is "laudable and important." I very much appreciate the focus on a multi-dimensional approach to assessing climate related resilience. The report cites important literature defining resiliency and vulnerability. The graphics are visually appealing and, as long as the data are accurate behind them, likely to be helpful for various users. But I have some concerns about the data being used in ways that might not be appropriate given the aggregation and operationalization issues that relate to data availability. I appreciate that such an index endeavor is limited to existing available data. But these limitations need to be much more clearly acknowledged.'

--Dr. Courtney Flint, Utah State University

Great care has been taken to ensure that the aggregations used in CRSI are correct and the authors have attempted to provide examples of how to use the index. Might elements of CRSI be misused? Of course, this is the case with any index or aggregation of data; however, the authors have taken great pains to ensure the accuracy and limitations of the available data. – Dr. Kevin Summers, U.S. EPA

Highlights of Results

In the section above, the maps and analytic results of the national application are shown. The highlights of the national analysis show moderate to strong resilience to natural hazard events throughout many of the counties in the U.S. Areas with weaker overall resilience include the Appalachians, many counties in the southeast and the western Mid-West and some counties in southwestern Texas. Strong contributors to the final CRSI scores are natural resource conservation, local demographics, and information pertaining to vacant structures. Weak contributors include infrastructure associated with utilities and communications and safety and security issues as well as the local mix of labor skills. Increases in these weak contributors could substantially enhance resilience to acute natural hazard events on a national scale.

Regional analyses (Table E-1) and mapping show that EPA Region 10 (14.8) and EPA Region 1 (10.7) have the strongest overall resilience scores with EPA Region 4 (0.6) and EPA Region 6 (2.8) having weaker scores. The remaining six EPA Regions cluster together with moderate scores (3.4-6.1). Disassembly of the CRSI scores shows that Region 10 strengths lie in its low risk score which result in a high basic resilience score even though its governance low is less than the national average. Although lower, its governance domain score is more than three times the Region's risk domain score. Region 1 strengths lie in the highest governance score in the Nation with moderate risk, and above average domain scores for social, built environment and natural environment. On the other hand, Regions 4 and 6 have above average risk domain scores and below average governance related to natural hazard events scores. Driving down these lower basic resilience scores, both regions have below average society domain scores suggesting a poorer population, increased ethnicity (making communication for emergency response more difficult), lower levels of social services, poorer access to health facilities, and higher level of undocumented skilled trade laborers (making an assessment of the abundance of trade labor difficult). Region 4 also has a below average score for its built environment suggesting less stringent building codes, higher levels of vacant structures and weaker levels of public infrastructure especially in Georgia and Alabama.

The utility of the index is addressed in Section 3 although the greatest level of confidence in utility can be found in the quotes listed below by reviewers from EPA Regions in response to the questions, "In your opinion, does the index have utility for EPA (e.g., Regions and Program Offices)?" and "Does this utility extend to community decision makers, community planners, and other potential stakeholders?".

"Yes - Using the data in work we do in each of our programs relative to pollution control implications and sustainability"
--Joyce Stubblefield, Region 6

"Absolutely! I like the discussion of ORD research related to natural disaster and other climate event resiliency topics …" --Laura Farris, Region 8

"I look forward to seeing the final report and using it in my own work." --Matt Nicholson, Region 3

Table E-1. CRSI and domain scores for EPA Regions with National Average scores (including Alaska); (Bold denotes significantly below national average for CRSI and above national average for domains).

EPA Region	Risk	Governance	Built Environment	Natural Environment	Society	CRSI
Region 1	0.240	0.660	0.492	0.445	0.599	7.530
Region 2	0.308	0.658	0.469	0.385	0.520	3.839
Region 3	0.272	0.571	0.382	0.378	0.512	2.934
Region 4	0.255	0.443	0.342	0.403	0.414	1.443
Region 5	0.222	0.696	0.407	0.434	0.572	5.476
Region 6	0.239	0.584	0.394	0.422	0.474	3.060
Region 7	0.209	0.683	0.358	0.380	0.609	4.469
Region 8	0.162	0.685	0.398	0.395	0.617	6.477
Region 9	0.235	0.551	0.620	0.469	0.480	5.524
Region 10	0.137	0.660	0.478	0.531	0.492	15.395
National Average	*0.229*	*0.597*	*0.393*	*0.413*	*0.516*	*4.321*

"Yes, there is potential use. Regions and programs are being asked that same question for other indices based on similar structure (national databases; selecting domains; comparison at a county scale) developed by ORD (e.g., HWBI). … Certainly, this will have utility at the county level and for others who can use it as is to aggregate above counties (such as coastal states or coastal counties). … Again, a community of practice across index developers could help quickly identify many issues that stakeholders have raised."

--Bruce Duncan, Region 10

To be fair, not all reviewers were as enthusiastic. Several reviewers not associated with EPA Regions found greater difficulty with the utility of the index. These reviewers thought it would be very helpful to indicate how the index could be used and how it should not be used. However, the target audience of CRSI is the EPA Regional staff working on resilience and sustainability issues and the index and its utility appears to resonant with the Regional reviewers. Overall, the U.S. shows good levels of resilience to acute climatic events. However, analyses demonstrate that selected counties (hundreds of them) with higher levels of risk and low levels of governance can improve their resilience by specifically addressing issues associated with the governance, built environment, natural environment, and society domains. CRSI, which is meant to be a screening tool, provides those directions investment, assistance and action by the EPA Regions and Program Offices.

1. Introduction and Background

Natural hazard events often impose significant and long-lasting stress on financial, social and ecological systems. From Atlantic hurricanes to midwest tornadoes to western wildfires, no corner of the U.S. is immune from the threat of a devastating climate-event. Statistics from the Office of Management and Budget show the federal government has incurred more than $357 billion in direct costs due to extreme weather and fire events alone over the last ten years (OMB and CEQ 2016). Starting in 2013, the U.S. Government Accountability Office (GAO) began monitoring the high-risk fiscal exposure that the federal government faces because of natural hazard-related events, both acute and chronic. The GAO recognized the sweeping impacts of these events across multiple sectors including defense, infrastructure, health, agriculture and local economies. In the most recent GAO report (2017), steps to better manage this fiscal risk had only been partially implemented. Further, the U.S. National Security Strategy (2015) highlights efforts in strengthening county and community resilience, suggesting that impacts from adverse natural hazard events represent an area of credible national security concern.

In general terms, resilience is a characteristic in human and natural systems exhibiting a capacity to withstand and recover from an adverse shock or event. In towns and cities, resilience is promoted through planning while in nature, this trait is assumed inherent (NRC 2012; Meadows 2008). Over the last decade, there has been a notable increase in communities seeking sustainable economic, social and ecological solutions for local planning concerns. However, more county and community decision makers are recognizing that recurring and anomalous natural hazard events may impede achieving their sustainability goals without appropriate and actionable preparation. Therefore, it is not surprising that interest in the subject of resilience related to natural hazard events, both cyclic and evolving, is growing.

Across the nation, there is a recognition that the benefits of creating environments resilient to adverse natural hazard events helps promote and sustain county and community success over time. The challenge for communities is in finding ways to balance the need to preserve the socio-ecological systems on which they depend in the face of constantly changing natural hazard threats. Resilience applies to both human and natural

SUSTAINABILITY AND RESILIENCE

"...RESILIENCE THEN BECOMES A THEORETICAL CONSTRUCT FOR SUSTAINABILITY THAT: A) GUIDES AGAINST BREACHING UNKNOWN SYSTEMS BOUNDARIES; B) SUGGESTS THAT CONTINUOUS CHANGES IN CERTAIN DRIVING VARIABLES ARE INHERENTLY DANGEROUS (E.G., CONTINUOUSLY INCREASING FISHING PRESSURE, ESCALATING GREENHOUSE GAS EMISSIONS, OR CONSTANT MATERIAL GROWTH) AND; C) WARNS THAT SURVIVING THE BREACH OF A MAJOR TIPPING POINT, WHETHER HUMAN INDUCED OR NATURAL, WILL REQUIRE UNPRECEDENTED LEVELS OF INVESTMENT, COOPERATION AND OTHER FORMS OF INSTITUTIONAL AND SOCIETAL ADAPTATION. HUMAN-INDUCED CLIMATE CHANGE WILL ALMOST CERTAINLY VALIDATE ALL THESE ASSERTIONS."

SUSTAINABILITY VS. RESILIENCE
PUBLISHED BY RESILIENCE.ORG ON 2014-07-16
BY WILLIAM E. REES

SOURCE URL: HTTP://WWW.RESILIENCE.ORG/STORIES/2014-07-16/SUSTAINABILITY-VSRESILIENCE systems, yet the examination of resilience is often described without appreciation of one another or in the context of opposing roles (Handmer et al. 2012)—with one system making the other more vulnerable. Previous research suggests that positive aspects of county and community quality of life are linked to not only built environments, but natural ones as well (Smith et al. 2012; Summers et al. 2012). Any discussion of county and community resilience would be incomplete without considering the role of natural ecosystems, as they have the ability to influence many of a county's and community's vulnerability and recoverability characteristics (Summers et al. 2012, 2015).

In the context of this research, vulnerability describes the propensity or predisposition to be adversely affected, while resilience describes the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner (IPCC 2012). Much of the existing resilience literature focuses on either vulnerability or recovery (e.g., Cutter et al. 2003; Frazier et al. 2014) as independent constructs of resilience. Summers et al. (2016) suggests a more holistic relationship exists, where an intersection of vulnerability and recoverability sits along a spectrum of resilience. The position along this gradient where human and natural systems rest depends on their ability or capacity for resilience. In terms of natural hazard events, for example, both people and nature can absorb, recover from and adapt to adverse events (Gunderson 2010; Berkes and Ross 2013). However, the degree of resilience is reflected in the mechanisms for recovery. Natural ecosystems have innate internal structures and functions to facilitate recovery from an adverse event (such as diversity and redundancy) (Holling 1986; National Fish, Wildlife and Plants Climate Adaptation Partnership 2012; Melillo et al. 2014). Human systems rely on planning and preparation to mitigate against known natural hazard exposures and reduce vulnerabilities (Tobin 1999; Magus 2010). In both systems, the success of the recovery process is dependent on the robustness of the mechanism. This robustness refers to the system's ability to resist or tolerate change without adapting its initial stable configuration. In the case of nature, ecological conditions may be the determining factor while the depth and breadth in resilience planning or governance is a pillar for resilience in built environments. Clearly, resilience is a disputed and heavily debated subject with regard to anthropogenic and natural systems (Patel et al. 2017). Community resilience remains an amorphous concept that is understood and applied differently by different groups.

Yet despite the differences in conception and application, there are well-understood elements that are widely proposed as important for a resilient community. All seem to agree that community resilience (non-individual) relates to the sustained ability of a community (or other entity) to utilize available resources to respond to, withstand, and recover (hopefully quickly) from adverse difficulties or perturbations (FEMA 2011, 2012, 2017; RAND 2017).

Operationally, in this report, a broad definition of community has been taken. Using a community definition of a social group of any size whose members reside in a specific locality, share government, and often have a common cultural and historical heritage,"community" could be synonymous with "county". Thus, the term "community," when used in this report means the grouping is a county unless specified otherwise. Resilience clearly can apply to a smaller community unit or neighborhood. That is not the case in this report. However, in many situations smaller communities resilience can be directly related to or driven by governance and activities at the county scale.

Many counties and communities are seeking assistance from the U.S. Environmental Protection Agency (EPA) to help fill resilience information gaps for disaster resilience planning. To better assist counties and communities, EPA's Office of Research and Development (ORD) has invested in research related to natural hazard event resiliency topics including:

- National Homeland Security Research Center's investigation of community resilience to acute disaster events (USEPA 2015b)
- National Center for Environmental Assessment research on resilience to climate change (USEPA 2016b)
- National Exposure Research Laboratory's (NERL) work with counties and communities to assess resilience to natural hazard events, particularly flooding (Lawrence, MA) (Zartarian 2016)
- National Risk Management Research Laboratory's (NRMRL) research focusing on linking resilience measures to adaptive management and governance to help frame sustainability assessments (Garmestani and Benson 2013; Garmestani and Allen 2014; Eason et al. 2016).

Of particular interest to EPA are the development of approaches to assess county and community resilience readiness in the face of adverse natural hazard events. As part of EPA's Sustainable and Healthy Communities (SHC) Research Program, a suite of indicators was developed to form the basis of a composite index—the Cumulative Resilience Screening Index (CRSI). CRSI characterizes county and community resilience based on a suite of indicators that are grouped into broad categories or domains of county and community resiliency traits in the context of natural hazard events. CRSI is intended to be used by EPA Regions and others who work closely with counties and communities to gauge resilience of built and natural systems to acute natural hazard events (e.g., hurricanes, wildfires, tornadoes, flooding). The CRSI approach focuses on characterizing county and community resilience to these natural hazards through an understanding of the existing conditions in socio-ecological systems – the baseline against which resilience is quantified. The index and constituent components serve to characterize baseline conditions for targeting resources and assessing the effectiveness of programs, policies and interventions specifically designed to improve natural hazard resilience. Five broad areas of common county and community characteristics or domains are the basis for formulating the screening tool. CRSI represents a synthesis of vulnerability and recoverability of a county's and community's built, natural and social environments in relation to the governance of these systems and context of the risk of natural hazard exposure (Figure 1.1).

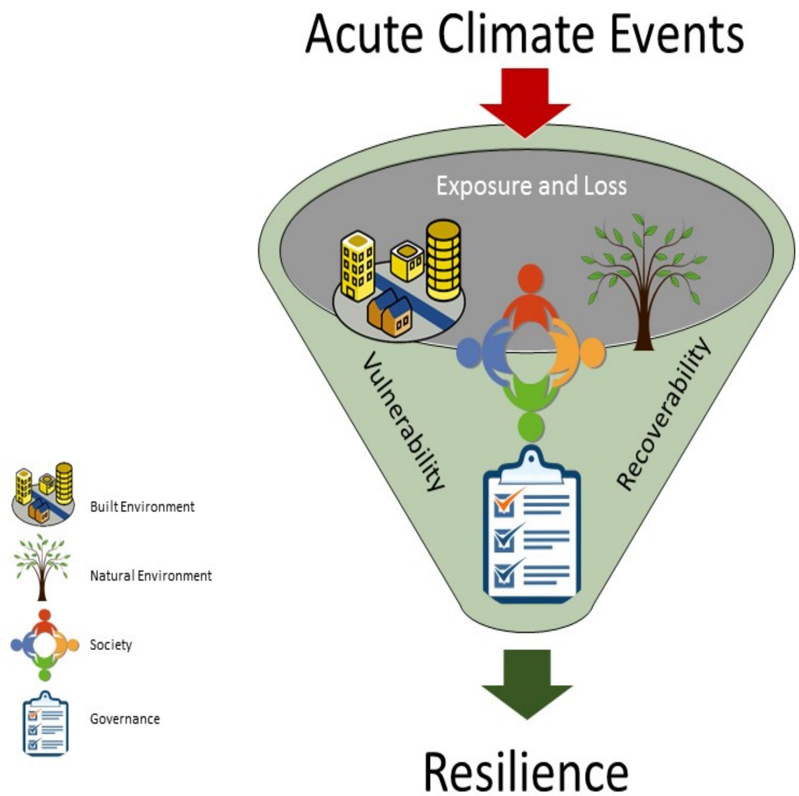


Figure 1.1 Conceptual representation of the Cumulative Resilience Screening Index (CRSI) Approach.

2. Approach

2.1. Overview of Indicator/Indices Development

The methodological challenge in deriving an index of resilience to acute natural hazard events lies in constructing domains and indicators that are accurate representations of environmental or societal states and trends but are easily understood by their target audiences. Methodological challenges involve two broad sets of questions: those concerned with the design and development of the index/indicators and those concerned with the purpose and use of the index/indicators. Basic concerns over data availability, data quality, and the adequacy of the algorithms used can be resolved largely through technical, scientific agreement. However, the central issue of adjusting methods to index relevance and use has to be addressed through tradeoffs between form and function in specific societal and political settings.

The general technical approach is based on a familiar and common one, in use for several decades to develop indices and compare components in a way to describe the current condition and help stakeholders identify areas to investigate for potential management actions/decisions (Stanners et al. 2007).

WHAT IS AN INDEX?

An index is made up of many components and indicator research has a language all its own. Here are few key definitions:

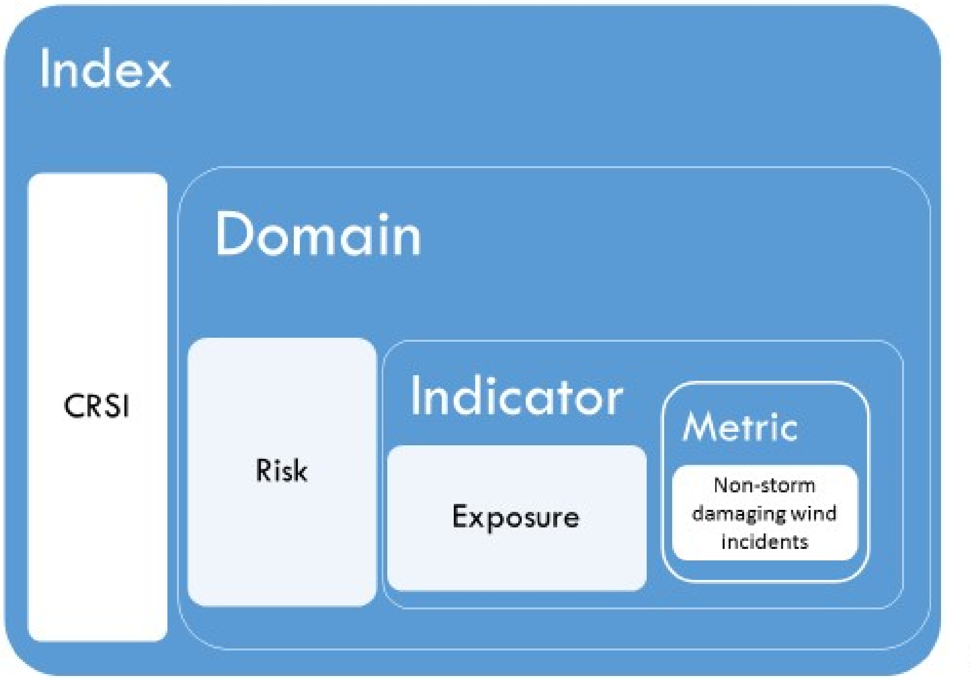
INDEX - An interpretable and synergistic value or category describing the nature, condition or trend of a multidimensional concept. An index can be an endpoint or final value as well as one of several values used to create what is called a composite index. CRSI is a composite index.

DOMAIN - Summary grouping of characteristics that is based on one or more indicators and represents a major component of a composite index. A domain and sub-index generally refer to the same level of information.

INDICATOR: An interpretable value describing a trend or status a specific feature or characteristic. An indicator may be comprised of one or more metrics.

METRIC: A measurable or observable value – typically referred to as "the data".

The relationship among domains, indicators and metrics is shown here as a nested box using the example of the CRSI index, the risk domain, the exposure indicator and a specific metric of exposure.



2.2. A Review of Existing Resilience Indicators and Indices

A review of existing community resilience characterization methods and approaches was conducted. The intent was to identify mainstream resilience indicators and indices and determine the applicability of each within the scope of CRSI. A Google Scholar search was analyzed through Publish or Perish® software (7/28/15) using the following keywords: “resilience index”, ecosystems, social, economic, human resilience, natural hazard, and climate change. The time period of interest was 2000-2015. The initial search produced 369 print and web publications. Material was considered for in-depth review if described index or framework met the following criteria:

- Provided quantified or demonstration results
- Comprised of a suite of indicators or sub-indices
- Exhibited spatially scalable characteristics
- Integrated some combination of economic, ecological and social factors
- Focused on natural hazards.

Fifty-seven candidate indicators were described in the materials reviewed. This representative group of existing resilience indices favored integrated socio-economic and ecological development approaches, but to varying degrees. Similarly, review results showed a notable trend toward the use of composite indices to characterize community resilience over the 2000-2015 time period (Figure 2.1).

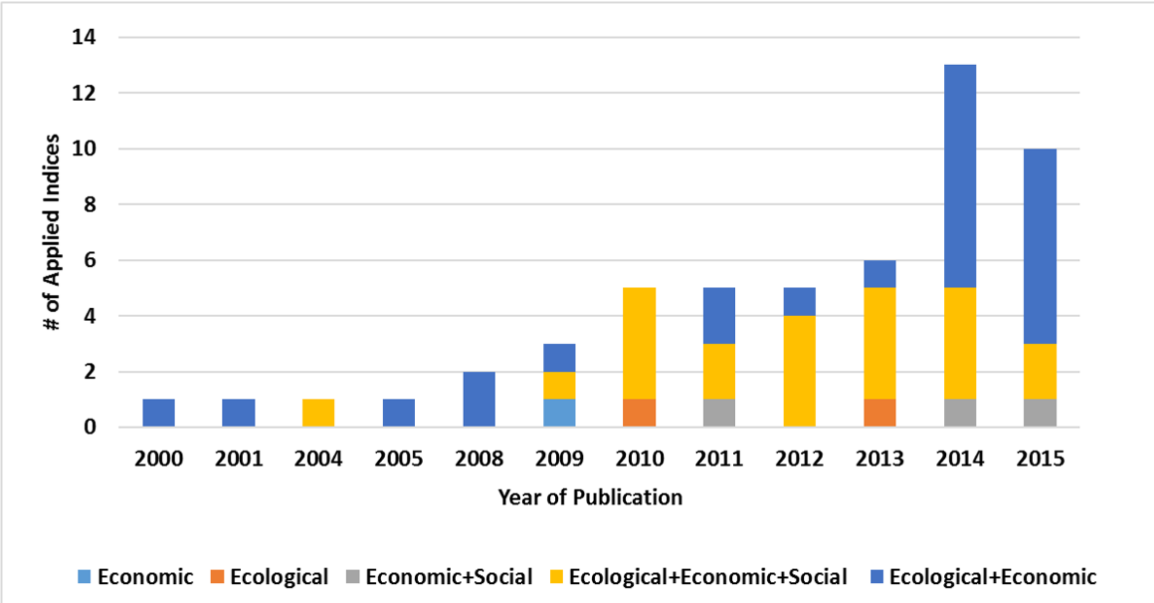


Figure 2.1 Number of applied resilience indices found using multi-factor composite index measures.

A pool of 27 published indices met all the criteria. This final set of existing index development approaches were used to further develop CRSI research efforts. Figure 2.2 briefly describes the literature review and culling process. Collectively, the remaining selected literature offered 297 indicators, topical categories or domain groups with 624 related metrics (Table 2.1).

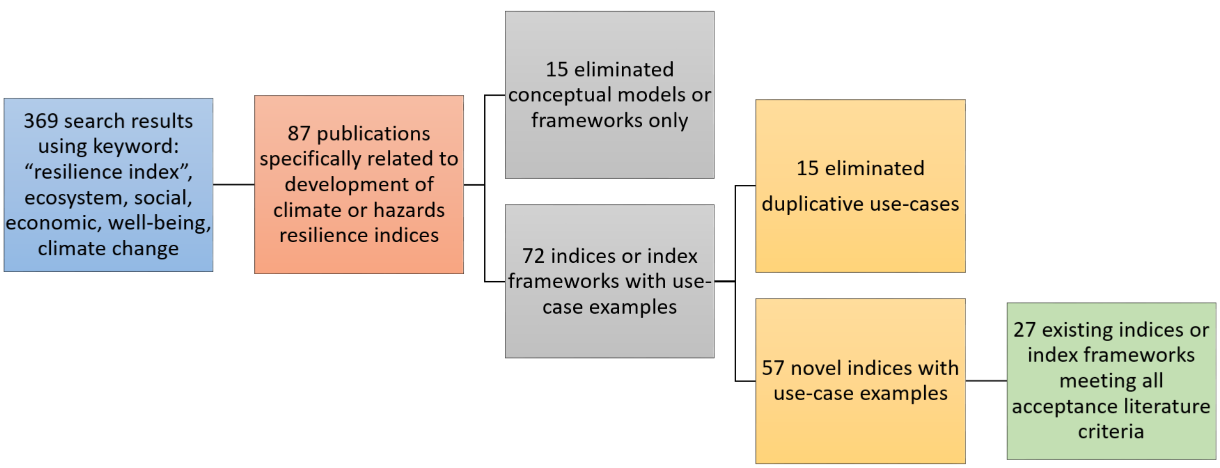


Figure 2.2 Publication elimination summary based on existing climate and natural hazard index development literature (2000-2015) used to inform CRSI research efforts.

Table 2.1 Existing measures of climate resilience included in this review, the number of domains/indicators and metrics used in each measure.

Index	Domains or Indicators	Metrics	Index	Domains or Indicators	Metrics
Agriculture Resilience Index (Ciani 2012)	11	27	Composite Measure of Ecological Integrity (Vickerman and Kagan 2014)	22	22
Arctic Water Resource Vulnerability Index (Alessa et al. 2008)	9	22	Displacement Risk Index (Esnard et al. 2011)	15	51
Baseline Resilience Indicators for Communities (Cutter et al. 2014)	49	49	EJ Screen Index (U.S. EPA 2015a)	12	12
City Resilience Index (ARUP 2014)	12	12	Environmental Performance Index (Hsu et al. 2016)	20	20
City Resilience Index to Sea Level Rise (Baraboo and Hassan 2014)	6	13	Environmental Sustainability Index (Esty et al. 2005)	21	76
Climate Disaster Resilience Index (Joerin and Shaw 2011; Peacock et al. 2010)	25 38	120 82	Environmental Vulnerability Index (Pratt et al. 2004)	50	50
Community Resilience Index (Kafle 2012; Renschler et al. 2010)	6	29	Flood Resilience Index (Batica 2015)	43	91
Community Resilience Index for the Gulf of Mexico (Baker 2009)	30	30	Flood Vulnerability Index (Balica 2012)	19	19
Community Risk Index (Daniell et al. 2010)	27	46	Household Resilience Index (Cassidy and Barnes 2012)	16	16
Composite Measure of Coastal Community Resilience (Li 2011)	6	27	Metrics for Community Resilience to Disaster (Burton 2015)	22	75
Composite Measure of Community Resilience (Meher et al. 2011)	52	130	Resilience Factor Index (Ainuddin and Routray 2012)	16	17
Composite Measure of Regional Resilience (Martini 2014)	7	27	Resilience Inference Measurement Model (Li 2013; Lam et al. 2016)	10	33
Composite Measure of Resilience to Disasters (Kusumastuti et al. 2014)	22	63	Sustainable Society Index (van de Kerk and Manual 2014)	21	21

A review of indicator categories and related measures presented in the literature showed that vulnerability concerns stood out as a major recurring theme. This is not surprising since identifying vulnerability is typically the first step toward defining resilience i.e., recognizing hazard exposure weaknesses (e.g., Balica 2012; Batica 2015). However, vulnerability alone is not sufficient to characterize natural hazard resilience. In several cases, existing indices offered well-rounded considerations for exposure vulnerability but often lacked similarly extensive measures of recoverability from these same exposures. (e.g., Alessa et al. 2008; Joerin and Shaw 2011).

There were examples of resilience indices that included both recovery and vulnerability indicators, but these tended to compartmentalize the constructs into two distinct considerations (e.g., Cutter et al. 2014) rather than in a synthesized fashion. While several existing indices (ARUP 2014; Cutter et al. 1996, 2003, 2014) provided a more balanced suite of vulnerability and recoverability resilience measures, scale or scope limited the generalizability of these indices to fully generate suites of nationally comparable measures.

2.3. Determination of Natural Hazard Event Factors to be Included in CRSI

The National Climate Assessment summarizes the current and future impacts of climate change in the United States (http://nca2014.globalchange.gov/report). In this report, the likely changes in climate and natural hazard events associated with geographic regions throughout the United States were assessed, as well as the infrastructure challenges these changes would likely create (Table 2.2). Extended heat waves (with associated drought), more frequent heavy downpours (with associated flooding), sea level rise, enhanced insect outbreaks, increased wildfires, altered timing of streamflow, increased and faster sea ice and glacial loss, and increased major storm events (including hurricanes, tornadoes and superstorms) are all resultant natural hazard changes that will likely be seen in the coming decade. Communities (human and natural) will need to "adapt" to meet the challenges presented by these changes. In human communities, that adaptation can take the form of enhanced governance to increase recoverability to these events. In natural communities, the "adaptation" likely will take the form of enhanced structural and functional redundancy to recover from stress. This combination of modified exposure and increased recoverability through governance and natural ecosystem processes is the basis of resilience.

In initial CRSI development discussions, climate/natural hazard experts in each of the ten EPA regions were interviewed to understand their views on the greatest natural hazard challenges in their regions. These reported challenges matched well with those identified in the National Climate Assessment and the 100 Resilient Cities report (Rockefeller Foundation and ARUP 2014), as depicted in Table 2.3. Rockefeller's 100 Resilient Cities helps cities around the world become more resilient to the physical, social and economic challenges of the 21st century. The EPA Regional interviews, the 100 Resilient Cities findings and the National Climate Assessment were combined to determine the eleven (11) natural hazard events that would be tracked in CRSI. These eleven natural hazard event types are:

- Hurricanes
- Tornadoes
- Inland Floods
- Coastal Flooding
- Earthquakes
- Wildfires
- Drought
- High Winds
- Hail
- Landslides
- Temperature Extremes (high and low deviations of temperature).

Table 2.2 Summarized climate impacts for regions of the U.S. from the 2014 National Climate Assessment Report. EPA regions within the regional assessment are identified in parentheses.

National Climate Assessment 2014 http://nca2014.globalchange.gov/report Regional Assessments	
Northeast *(EPA Region 1, Region 2 and Region 3 (excluding VA)* Heat waves, heavy downpours, and sea level rise pose growing challenges to many aspects of life in the Northeast. Infrastructure, agriculture, fisheries, and ecosystems will be increasingly compromised. Many states and cities are beginning to incorporate climate change into their planning.	***Southwest*** *(EPA Region 9 and Region 8 (UT and CO) Region 6 (NM))* Increased heat, drought, and insect outbreaks, all linked to climate change, have increased wildfires. Declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas are additional concerns.
Southeast and Caribbean *(EPA Region 3 (VA), Region 4, Region 6 (AR and LA))* Sea level rise poses widespread and continuing threats to the region's economy and environment. Extreme heat will affect health, energy, agriculture, and more. Decreased water availability will have economic and environmental impacts.	***Northwest*** *(EPA Region 10 excluding Alaska)* Changes in the timing of streamflow reduce water supplies for competing demands. Sea level rise, erosion, inundation, risks to infrastructure, and increasing ocean acidity pose major threats. Increasing wildfire, insect outbreaks, and tree diseases are causing widespread tree die-off.
Midwest *(EPA Region 5 and Region 7 (IA and MO))* Extreme heat, heavy downpours, and flooding will affect infrastructure, health, agriculture, forestry, transportation, air and water quality, and more. Climate change will also exacerbate a range of risks to the Great Lakes.	***Alaska*** *(EPA Region 10)* Alaska has warmed twice as fast as the rest of the nation, bringing widespread impacts. Sea ice is rapidly receding and glaciers are shrinking. Thawing permafrost is leading to more wildfire, and affecting infrastructure and wildlife habitat. Rising ocean temperatures and acidification will alter valuable marine fisheries.
Great Plains *(EPA Region 6 (TX and OK), Region 7 (KS and NE) and Region 8 (excluding UT and CO))* Rising temperatures are leading to increased demand for water and energy. In parts of the region, this will constrain development, stress natural resources, and increase competition for water. New agricultural practices will be needed to cope with changing conditions.	***Hawaii*** *(EPA Region 9)* Warmer oceans are leading to increased coral bleaching and disease outbreaks and changing distribution of tuna fisheries. Freshwater supplies will become more limited on many islands. Coastal flooding and erosion will increase. Mounting threats to food and water security, infrastructure, health, and safety are expected to lead to increasing human migration.

Table 2.2 Summarized climate/natural hazard impacts and resilience issues for selected cities of the U.S. from 100 Resilient Cities and ICLEI/RC4A (Local Governments for Sustainability (previously the International Council for Local Environmental Initiatives)/Resilient Communities for America)

EPA Region	City/Climate Impacts	Extreme Heat; Warming	Severe Drought	Extensive Wildfire	Air Quality	Extreme Rainfall; Flooding	Storms; Sea-level rise; Erosion	Water Quality/ Quantity	Infrastructure Damage	Other Resilience Issues
1	* Boston, MA					-	-		-	affordable housing, social inequity
1	Cambridge, MA					x			x	
2	** New York, NY	x					x			poor transportation system
3	Washington, DC	x				x	-		x	transportation and evacuation bottlenecks
3	Norfolk, VA					x	x		x	
3	Lewes, DE						x			
3	* Pittsburgh, PA					-	-		-	environmental degradation, infrastructure failure
4	Atlanta, GA	x								
4	Broward County, FL						x		x	
4	Miami Dade County, FL						x	x	x	
5	Minneapolis, MN	x				x				
5	Milwaukee, WI		x			x			x	
5	Grand Rapids, MI	x				x	x		x	
5	Ann Arbor, MI	-								
5	** Chicago, IL	x				x	x		x	endemic crime, infrastructure failure, public health
6	* New Orleans, LA						x	x	x	infrastructure failure
6	Houston, TX	x	x			x	x		x	
6	* Dallas, TX					x			x	energy shortages, infrastructure failure
6	** El Paso, TX	x	x			x		x		social inequity, epidemic drug & alcohol abuse, poor
6	* Tulsa, OK					-	-		-	social inequity
6	Tucson, AZ	x	-					x		
7	Dubuque, IA	x	x			x			x	crop failures
7	* St. Louis, MO	-				-	-		-	social inequity, endemic crime, civil unrest
8	* Boulder, CO	x		x	x	x			x	invasive species, disease, affordable housing
8	Colorado Springs, CO	x		x	x				x	
8	Denver, CO	x		-	x					
8	Salt Lake City, UT	-		-				-		
9	San Diego Bay Region, CA	-	-	-			-			
9	* Los Angeles, CA		x					x	x	earthquake, tsunami
9	* Oakland, CA						-			social inequity, earthquake, affordable housing
9	* San Francisco, CA	-	-	-						earthquake
9	* Berkeley, CA	x		x						earthquake
10	Eugene, OR		x	x						cold water species diminishing, invasive species
10	Beaverton, OR	-	-	-		-		-		
10	King County, WA	x				x	x		x	

(*) 100 Resilient Cities (**) ICLEI/RC4A & 100 Resilient Cities (x) Impacts Experienced (-) Projected Impacts

2.4. The CRSI Conceptual Framework

No singular approach among existing composite measures of natural hazard resilience met all the expected needs for developing CRSI. Collectively, however, the reviewed literature provided many of the building blocks (e.g., suites of indicators, indicator groupings, domains). A "heat map" table (Table 2.4) depicts the metric distribution of the final 27 existing indices across resilience topics of interest to CRSI. To varying degrees, all the existing indices offered patterns of indicator groupings supporting the broad areas of interest for CRSI which formed the basis of five sub-indices or "domains" to describe overall resilience:

- Natural Environment
- Society
- Built Environment
- Governance
- Risk

While none of the indices reviewed provided all possible indicators of interest to CRSI, 10 of the 27 publications included information relevant for describing all five CRSI domains. The Natural Environment, Governance and Risk domains were most frequently excluded from existing measures. Five indices (BRIC, CDRI1, CDRI2, M-RD and M-CRD) offered fairly comprehensive descriptions of indicators relevant for quantifying CRSI domains. The Climate Disaster Resilience Index 2011 (CRDI1) contributed the most to the proposed CRSI structure; addressing all domains based on a suite of 18 indicators.

Indicators and metrics from the selected literature were paired with one of the five CRSI domains. Twenty-one domain-specific indicators were derived from 117 unique metrics. Figure 2.3 depicts the final CRSI conceptual framework. Constituents of CRSI: Domains and Indicators of Community Resilience to Acute Natural Hazard Events. In this section, a summary description of each CRSI domain and related indicators is provided. The summaries highlight the importance of the domains in natural hazard related resilience and the indicators used to characterize the five domains. For each indicator, example measures (metrics) are listed. For more detailed information about the individual metrics for each indicator, refer to Appendix A.

Table 2.4 Summary of literature reviewed index by topical areas of interest for development of CRSI.

CRSI Review Summary			Selected Index/Framework																										
Domains of Resilience	Topic of Interest	Candidate Measurement Categories	ARI	AWR	BRIC	CRI	CRIS	CDRI	CDRI	CResI	CRIG	CRisk	MCC	MCR	MRR	M-RD	M-EI	DRI	EJSI	EPI	ESI	EVI	FRI	FVI	HRI	M-	RFI	RIM	SSI
Natural Environment	Extent of Natural Areas	Managed Lands																											
		Ecosystem Type																											
	Integrity	Condition																											
Society	Economy	Economic Diversity																											
		Employment																											
		Insurance																											
	Critical Services	Safety & Security																											
		Social																											
		Labor/Trade																											
	Characteristics	Demographics																											
		Health																											
Built Environment	Infrastructure Integrity / Continuity	Communication																											
		Transportation																											
		Utilities																											
	Structure / Housing Characteristics	Non-Residential																											
		Residential																											
		Shelter																											
Governance	Preparedness	Planning																											
		Investment																											
	Response	Expenditure																											
		Time																											
Risk	Losses	Property																											
		Human																											
	Hazard Exposure	Geophysical																											
		Technology Hazards																											

 # Existing Measures Related to Topic of Interest 3 5 10 20 +

List of index abbreviations: (ARI -Agricultural Resilience Index AWRVI -Arctic Water Resource Vulnerability Index BRIC -Baseline Resilience Indicators for Communities CRI-City Resilience Index CRISLR City Resilience Index to Sea Level Rise CDRI1-Climate Disaster Resilience Index 2011 CDRI2-Community Disaster Resilience Index 2010 CResI-Community Resilience Index CRIG -Community Resilience Index for the Gulf of Mexico CRiskI-Community Risk Index MCCR -Composite measure of coastal community resilience MCR-Composite measure of community resilience MRR -Composite measure of regional resilience M-RD -Composite measure of resilience to disasters M-EI -Composite measures of ecological integrity DRI-Displacement Risk Index EJSI-EJ SCREEN Index EPI -Environmental Performance Index ESI-Environmental Sustainability Index EVI-Environmental Vulnerability Index FRI-Flood Resilience Index FVI -Flood Vulnerability Index HRI -Household Resilience Index M-CRDMetrics for community resilience to disasters RFI-Resilience Factor Index RIMM -Resilience Inference Measurement model SSI-Sustainable Society Index).

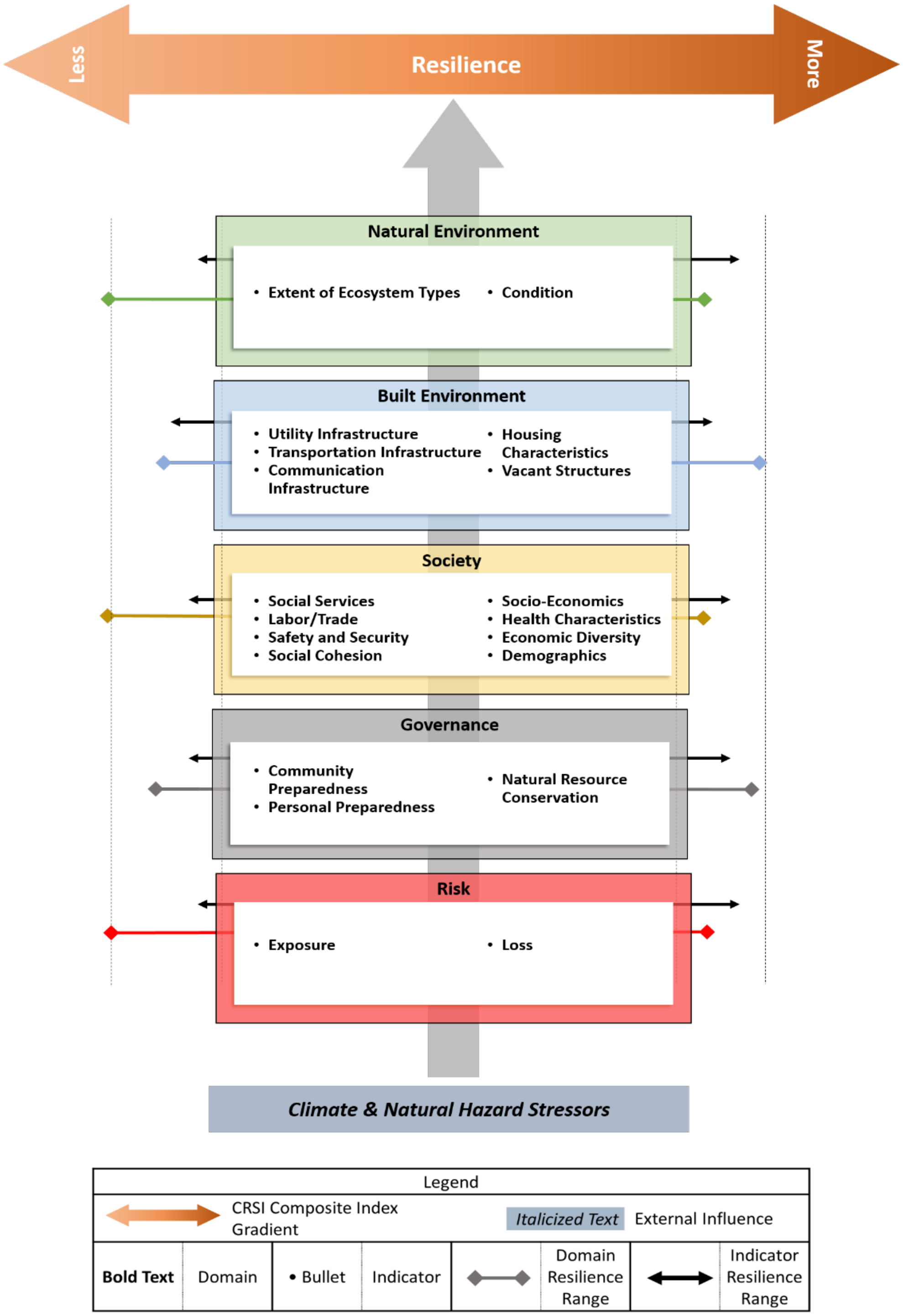


Figure 2.3 Final CRSI conceptual framework. Arrows projected from boxes to the left and right represent hypothetical increases and decreases in ranges for indicators (black arrows) and domains (colored arrows).

2.4.1. Risk Domain

The risk domain of CRSI represents the characteristics of a place that contribute to a level of exposure or loss resulting from specific hazards (climatic events, e.g., sea level rise, hurricane, tornado, wildfire, drought, etc.). Risk, as a construct, typically represents the likelihood that an interaction with a hazard will result in an adverse outcome. Within the CRSI framework, hazard exposure is dealt with wholly within the risk domain. This contrasts with vulnerabilities, handled as both losses in the risk domain, and socioeconomic characteristics, dealt with across multiple domains. Socioeconomic characteristics are typically the focus of interventions taken to increase resilience. Most geologic and atmospheric hazards cannot be controlled or predicted, and only the likelihood of an event occurring in a specific timeframe can be calculated. In the natural hazard resilience arena, this is the likelihood that a storm with specific severity will occur, that sea level will rise by a certain amount, that a wildfire will occur, or extreme total rainfall will occur. Potential for exposure results when there is more than zero likelihood of a threat occurring in the same location as human and natural populations or the built environment.

Risk is assessed as a product of exposure probability and vulnerabilities, or the consequences associated with that exposure. For example, assets (e.g., a county, community or built environment) constructed in a river's floodplain have enhanced potential exposure to flooding; or an oil rig located near a natural ecosystem (e.g., forest), enhances the potential exposure of the ecosystem to oil. Similarly, managed ecosystems (e.g., managed forests, agriculture) constructed in drought prone areas, have enhanced potential exposure to drought. In each of these scenarios, risk is the result of exposures and vulnerabilities in a system that could yield a loss. If the goal of a county or community is to minimize negative impacts, there are two options: reduce the exposure or reduce the vulnerability. Depending on the structure of the county or community and the nature of the vulnerability, one option may be easier to achieve. In a flood prone county and community, for example, risk can be reduced by either reducing exposure potential, e.g., using residential zoning to eliminate building in flood prone areas, or by reducing vulnerability, e.g., by raising houses in a flood zone. In either case, identification of exposure and resulting impacts is necessary to inform the decision, and this is the intent of the risk domain. In the CRSI model, risk is characterized by two indicators – exposure and loss. The specific natural hazard events and technological hazard types are listed in Table 2.5. A more in-depth discussion of the risk domain can be found in Buck et al. (2017).

Indicator: Exposure

The exposure indicator addresses the probability of hazard occurrence across a full spectrum of geologic and atmospheric events as well as additional technological hazards that may coincide with, or be exacerbated by, the events. The geophysical category of metrics represents the likelihood of occurrence of a geologic or atmospheric hazard based on location of populations (human and non-human) and built environment. This category of metrics is represented by metrics that characterize both historic and proximity-based likelihood of hazard occurrence. The technological hazards category of metrics represents the probability of exposure to hazards resulting from built technologies (e.g., nuclear power plants, oil pipelines, chemical manufacturing). The exposure indicator includes measures of:

- Earthquake probability
- Extreme high temperature incidents
- Extreme low temperature incidents
- Flood probability
- Hailstorm probability
- Hurricane probability
- Landslide probability
- Damaging wind incidents
- Tornado probability
- Wildfire probability

CRSI calculates risk of exposure to acute natural hazard events and selected natural geological hazards (e.g., earthquakes and tectonic landslides). The index does not address long-term climate change and its secondary effects. The one exception is sea level rise; however, CRSI uses sea level rise as part of coastal flooding based on historic rise and not as a future measure of predicted sea rise level from climate change. Similarly, CSRI does not directly address secondary effects of some acute natural hazard events (e.g., pest abundance, hydrologic shifts) but rather addresses these through the direct acute natural hazard events associated with them (e.g., drought, high temperatures). Similarly, CRSI does not include standard climatic events (e.g., rainfall, snowfall).

In addition, exposure for each county, parish and borough is modified by the proximity of technological or anthropogenic hazards including the presence of:

- Nuclear sites
- Toxic release sites
- Superfund sites
- Resource Conservation and Recovery Act (RCRA) sites

This exposure modification is the result of the probability of exposure to a natural hazard event in a pixel multiplied by one plus the probability of a technological hazard being located with a 5mile radius for Superfund sites and a 10-mile radius of the pixel for other technological hazards; thus, enhancing the overall exposure.

Indicator: Loss

The loss indicator addresses an aspect of a place’s vulnerability represented through historical loss of life and property (including crops) associated with specific hazards. The property loss indicators describe estimated and actual costs associated with property and crop losses as a direct result of a hazard. Many of the potential metrics for this indicator would come from the Spatial Hazard Events and Losses Database (SHELDUS). Similarly, the human losses indicator represents the loss of human life directly resulting from a hazard with metrics largely coming from the SHELDUS database. The loss indicator includes human loss (i.e., fatalities and injuries), property loss (i.e., property damage) and natural area loss (i.e., increase in impervious surface).

2.4.2. Governance Domain

"Governance" describes the collaboration of government agencies and Non-Governmental Organization (NGOs) or private actors (e.g., companies, citizens, etc.) towards joint objectives within a system of rules and regulations (e.g., hierarchies, markets, networks, counties and communities, etc.) (Benz 2001; Liesbet and Marks 2003; Bache and Flinders 2004a, b). Consequently, governance includes both formal and informal coordination processes among, across and beyond different sectors of public administration. It has been increasingly recognized that resilience problems related to natural hazard events can only be sufficiently handled in an integrative way to include diverse policy fields from all scales (Benz 2001) and actors from different fields (Huiteman et al. 2009; Pahl-Wostl et al. 2012; ARUP 2014). However, the administrative systems of many U.S. federal, state, county, city and community agencies are predominantly organized by sector. This organization makes coordination a major challenge in the wake of a severe natural hazard event; such as, flooding and sea level rise (Adger 2001; Adger et al. 2005b; Pahl-Wostl 2007; Unwin and Jordan 2007; Knieling and Filho 2012), storm readiness (Wachinger et al. 2013; Adger 2001), water/river basin management (Cosens and Williams 2012), and fire protection readiness (Abrams et al. 2015). In light of these challenges, governance requirements for improving collaboration between sector-administrations, governmental, and non-governmental actors and new forms of governance must be introduced (e.g., integrated coastal zone management for storm events, oil spills, etc.) to bolster the ability of each state, county, parish and borough to recover from natural hazard-related severe events (Crowder et al. 2006; Ramseur 2010; Colten et al. 2012). In CRSI, we have included three indicators in the governance domain to represent the importance of governance in resilience to natural hazard events. These are community preparedness, natural resource conservation and personal preparedness.

<u>Indicator: Community Preparedness</u>

The community preparedness indicator addresses county and community resilience strengthening and structure hazard mitigation. While there is general consensus that community resilience is defined as the ability of communities to withstand and mitigate the stress of a disaster, there is less clarity on the precise resilience-building process (Chandra et al. 2011). In other words, we have limited understanding regarding the specific components that counties and communities can change or the "levers" for action that enable counties and communities to recover more quickly (although as a screening tool a selection of actions can be determined). Clearly, community preparedness and planning for such events helps to foster continuity and stability, defining roles and functions, and how rebuilding of lives, homes, livelihood, kinship and community will occur (Adger et al. 2005b, Walsh 2007, Linnenluecke et al. 2012).

Structural hazard mitigation is another form of community preparedness. Structural measures are any physical construction designed to reduce or avoid the possible impacts of hazards. Common structural preparedness measures could include dams, flood levees, ocean wave barriers, earthquake-resistant construction and evacuation shelters. The community preparedness indicator in CRSI includes measures of both county and community resilience strengthening, from Community Rating System (CRS) information, and structural hazard mitigation, from Small Business Administration (SBA) recovery mitigation information.

Indicator: Personal Preparedness

The personal preparedness indicator addresses individual or household activities that help protect personal property from acute natural hazard events. Personal preparedness plans run the gamut, including developing a written plan identifying risks, access to facilities and functional needs, protection of children and the elderly, shelter plans and caring for pets (Paton and Johnston 2001). While ideal measures, CRSI does not include measures to address all these issues because nationally consistent data are lacking. Instead, CRSI targets two major personal preparedness actions that protect property; namely, availability and coverage of homeowner's insurance and participation in the National Flood Insurance Program (NFIP). Flooding is the most common natural hazard, but many home insurance policies do not cover natural or climatic event flooding. In 1968, Congress created the NFIP to fill this void by providing flood insurance protection to property owners. Insurance or insurability relates to numbers of structures/property that are insured (which can initiate recovery through an infusion of cash to start rebuilding) (Cutter et al. 2009).

Indicator: Natural Resource Conservation

The natural resource conservation indicator addresses the protection of natural resources from anthropogenic activities. Protected natural ecosystems are usually better able to recover from acute natural hazard events (Tompkins and Adger 2004, Strickland-Munro et al. 2010). Natural resource conservation management refers to the management of natural resources (i.e., ecosystems) with particular focus on how management affects the quality of life for both present and future generations as well as the sustainability of the ecosystem itself. The Community-Based Natural Resource Management (CBNRM) approach combines conservation objectives with the generation of economic benefits for counties and communities (Kellert et al. 2000). A limitation of using the CBNRM relates to the difficulty of reconciling and harmonizing the objectives of socioeconomic development, diversity protection, and sustainable resource utilization. The issue of biodiversity conservation is regarded as an important element in natural resource management as well as in recovery potential from acute natural hazard events. The CRSI's use of natural resource conservation indicator related to biodiversity land protection (Land Protection Priority Index for preserving biodiversity) targets the use of conservation protection by states/counties/communities.

2.4.3. Society Domain

The concept of society, as used in CRSI, includes all human aspects of a community except the built environment. These are the constructs that represent the economic, demographic, and social interactions common to all urban and rural populations. Society is a group of people involved in persistent social interaction or a large grouping of people sharing the same geographical or social territory. These groups typically are subject to some political authority and often similar dominant cultural expectations. More broadly, a society may be characterized as an economic, social, industrial or cultural infrastructure made up of, yet distinct from, a collection of individuals. Thus, society can include the objective and subjective relationships people can have with the material world and other people. Proposed society indicators in CRSI include demographics, economic diversity, health characteristics, labor and trade services, safety and security, social cohesion, social services and socio-economics Balbus and Malina 2009).

Indicator: Demographics

The demographics indicator includes aspects of vulnerable populations. Demographics of a county or community reflect attributes of the county's or community's general population; namely age structure, ethnicity, and socioeconomic levels. All these factors can influence the ability of a county or community to recover from a disaster (Lugo 2000; Vasques-Leon et al. 2003; Heltberg et al. 2009; Ibarraran et al. 2009; Steinbruner et al. 2013). Vulnerable populations represent those fractions of the population that may be particularly susceptible to impacts resulting from acute natural hazard events. The vulnerable populations include:

- proportion of the population that is 65 years or older and living alone
- enclaves isolated by language (Non-English-speaking populations)
- groups of persistent homeless persons/families
- proportion of the population under the age of 5 years

Indicator: Economic Diversity

The economic diversity indicator represents factors associated with economic stability and recoverability. Economic diversity addresses issues associated with a society's ability to monetarily respond and recover from a natural hazard event (Klein et al. 2003, Linnenluecke et al. 2012). Economic diversity relates to the array of business sectors a county or community might have and the equitable distribution of economy. Lack of business sector diversity can suggest a more difficult path for economic recovery (Adger et al. 2005a; Reusch et al. 2005; Adger 2010). Employment and employment conditions can be important for a county's or community's recoverability.

The economic diversity indicator is represented by two indices – the Gini Index (Gastwirth 1972) and the Hachman Index (Hachman 1994). The Gini Index is a measurement of the income distribution of a county's residents. This number, which ranges from 0 to 1 and is based on residents' net income, helps define the gap between the rich and the poor, with 0 representing perfect equality and 1 representing perfect inequality. It is typically expressed as a percentage and is often referred to as the Gini coefficient. The Hachman Index incorporates location quotients, which measure relative industrial concentration in one area compared to that in another area. Location quotient (LQ) is a valuable way of quantifying how the concentration of a particular industry, cluster, occupation, or demographic group in a spatial unit (e.g., region, state, county) compared to the nation. It can reveal what makes a particular area unique compared to the national average. The Hachman Index is a measure of economic diversity that compares the industry composition of a state to the industry composition of the nation by taking the total employment of an industry in a state divided by total state employment and comparing it to the nation's equivalent.

Indicator: Health Characteristics

The health characteristics indicator addresses factors associated with healthcare access, special health vulnerability populations, and specific health problems related to or exacerbated by acute natural hazard events. The general health characteristics of a population emphasize conditions associated with greater vulnerability to natural hazard events such as respiratory or cardiac condition changes during periods of intense heat; hospitalization conditions requiring electronic equipment during times of loss of power during floods, hurricanes or tornadoes; or, injuries or premature death related to extreme weather events (Greenough et al. 2001; McMichael et al. 2003; McMichael et al. 2006; Melillo et al. 2014). Access to healthcare means the timely use of personal health services to achieve the best health outcomes; such as, gaining entry into the health care system, accessing a health care location where needed services are provided and finding a health care provider with whom the patient can communicate and trust (Ebi 2011, Oven et al. 2012). Healthcare access is represented by a single measure of the proportion of the county's population with health insurance. Special health-care needs vulnerabilities represent any individual, group or community whose circumstances create a barrier to accessing emergency services because of pre-existing health conditions or vulnerabilities. Of concern are the more than 23 million U.S. residents (roughly 12% of the total population aged 16 to 64 years) with special health-care needs due to disability (U.S. Census Bureau 2016). This population is diverse and broadly distributed and deserves special attention because there is an 80% chance that any person will experience a temporary or permanent disability at some point in their lives (Kailes and Enders 2007). Specific health problems represent the proportion of a county's population with special health issues that can be exacerbated by acute natural hazard events. These health conditions include:

- asthma
- cancer
- diabetes
- heart disease • obesity
- stroke.

Indicator: Labor and Trade Services

The labor and trade services indicator addresses factors related to recoverability from an acute natural hazard event associated with construction (Kirrane et al. 2013). In short, does a county or community have the appropriate construction skills to provide for accelerated recovery and represent a resilient construction workforce? Skilled construction labor is a segment of the workforce with a high skill level that creates significant economic value or, in this case, recoverability through the work performed by human capital. Labor and trade services represent the availability of skilled labor and tradecraft that can be utilized in the aftermath of a natural hazard event (e.g., carpenters, bricklayers, engineers, roofers, construction workers, civil servants). This indicator includes construction skills (represented by adjusted numbers) relating to:

- concrete construction
- framing
- highway construction

- masonry
- power construction
- roofing
- steel construction • water construction.

Indicator: Safety and Security

The safety and security indicator addresses the provisioning of emergency and civil services. The primary definition of safety is “the condition of being free from harm or risk”, which is essentially the same as the primary definition of security, which is “the quality or state of being free from danger.” The hierarchy considers safety needs secondary only to basic physiological needs like food and water. The need for safety has to do with our natural desire for a predictable, orderly world that is somewhat within our control. In relation to the development of the CSRI, safety targets the provisioning of the types of emergency services that would be necessary for a reasonable and rapid recovery from an acute natural hazard event. Safety and security services encompass the availability of emergency first responders, medical personnel, civil order, and legal services. Measurements related to these services demonstrate a county’s or community’s ability to respond and the timing of that response to the results of a natural hazard event (e.g., flood, hurricane, tornado, wildfire). The specific emergency and civil services included in the safety and security indicator include adjusted numbers of personnel associated with emergency services, law enforcement personnel, law enforcement support personnel and public safety personnel Christopher and Peck 2004, Keim 2008).

Indicator: Social Cohesion

The social cohesion indicator represents the willingness of members of a society to cooperate with each other in order to survive and prosper. We define social cohesion as a society that works toward the resilience of all its members, fights exclusion and marginalization, creates a sense of belonging, promotes trust, and offers its members the opportunity of upward mobility. Social cohesion can be an important element of recoverability after a natural hazard disaster (Baldwin and King 2018, Meitzen et al. 2018, Sanchez et al. 2017). It represents community and family-centric networks and value structures with an emphasis on the characteristics that increase the likelihood of vulnerability (e.g., sense of place) and/or recoverability (e.g., family and social networks) (Schwartz and Randall 2003; Adger et al. 2005b; Baussan 2015). Social cohesion plays a significant role in the planning for resilience to acute natural hazard events and in the execution of that planning after an event. The constituent elements of social cohesion (OECD 2011), include social inclusion, social capital, and social mobility. Social capital, the resources that result from people cooperating toward a common end, can play an important role in event. In the CRSI framework, social cohesion addresses access to social support. The measures of social cohesion include volunteering and volunteer organizations, ethnic diversity and the proportion of population native to a county or community.

Indicator: Social Services

The social services indicator for CRSI is represented by a range of public services provided by government, private, and non-profit organizations. Access to these services is critical for recovery from an acute natural hazard event and include the availability of services unrelated to infrastructure, labor/trade, emergency services and civil control important for a county's or community's response to a natural hazard event (Dominelli 2013). These services would relate to laws, childcare, education, healthcare, and faith-based organizations. In the CRSI framework, this indicator is represented by:

- index depicting the average medically underserved population
- number of blood and organ banks in a county relative to the county's population
- access and availability of childcare facilities
- number of emergency shelter and goods providers in a county relative to the county's population
- number of food service providers in a county relative to the county's population
- number of hospitals in a county relative to the county's population
- number of insurance claims in a county relative to the county's population
- number of educational facilities in a county relative to the county's population and support for those facilities
- mental health services
- percent of the county population living in a health professional shortage area (HPSA)
- number of physician services in a county relative to the county's population
- number of rehabilitative services in a county relative to the county's population
- number of religious organizations in a county relative to the county's population
- number of social advocacy facilities in a county relative to the county's population
- number of special needs transportation facilities in a county relative to the county's population.

Indicator: Socio-Economics

The socio-economic indicator for the CRSI society domain relates to employment opportunity and issues associated with personal economics, primarily level of income. Employment opportunity is represented by overall county-level unemployment rate. Employment and employment conditions can be important for a county's or community's recoverability. This indicator would include metrics like unemployment rates, underemployment rates and the formation of human capital (Marston 1985; Cohen 2011; Peiro et al. 2015). Personal economics relate to personal finances and involves all financial decisions and activities of an individual or household. The most basic of these activities is income, both actual income and relative income. For the socio-economic indicator, personal economics is represented by three measures: the proportion of a county's population that earns less than 150% of the poverty guidelines for a specific household size, county unemployment rate and the median income for the county.

2.4.4. Built Environment Domain

The concept of a built environment is relatively recent, and it was initially coined by social scientists (Rapoport 1976). The "built environment" describes the man-made surroundings that provide the setting for human activity, ranging in scale from buildings and greenspaces to neighborhoods and cities. The scope of the built environment typically includes supporting infrastructure such as water supply, energy networks and transportation corridors. The built environment is a material, spatial and cultural product of human labor that combines physical elements and energy in forms for living, working and playing (Roof and Oleru 2008). In recent years, public health research has expanded the definition of "built environment" to include healthy food access, community gardens, "walkability" and "bikeability" (Lee et al. 2012). The urban fabric is a complex socio-technical system that encompasses different scales – buildings, building stocks, neighborhoods, cities and regions – each with different time constants, actors and institutional regimes. The term "built environment" has also been adapted to address the relation between the built and the "unbuilt" part of the environment. This corresponds to the definition of a socioecological system where the "built environment" can be considered an artifact in an overlapping zone between culture and nature, with causation occurring in both directions. The sustainability debate and the growing awareness of risks to the built environment due to natural hazard change and natural hazard events have all helped to focus attention on the fragilities and the need to create resilience in the built environment (Hassler and Kohler 2014). In CRSI, we have included five indicators in the built environment domain to represent the importance of built environment in resilience to natural hazard events; communications infrastructure, housing characteristics, transportation infrastructure, utility infrastructure, and vacant structures.

Indicator: Communications Infrastructure

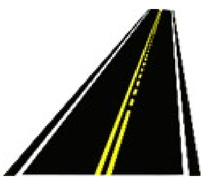
Continuity of communications is the ability of a county, community or organization to execute its essential functions at its continuity facilities. This continuity depends on the identification, availability and redundancy of critical communications and information technology systems to support connectivity among key government leadership personnel, internal elements, agencies, critical customers and the public during crisis and/or disaster conditions Martins et al. 2017, Wang and Wang 2017, Zimmerman 2017). The communications infrastructure indicator primarily addresses a county's or community's communications continuity in the aftermath of an acute natural hazard event. This indicator encompasses the number and distribution of:

- cell phone towers
- land mobile towers
- microwave towers
- paging towers
- radio broadcast towers
- TV transmission towers • areas of no internet coverage.

Indicator: Housing Characteristics

Housing characteristics relate to the types of households distributed throughout a county and their structural vulnerability. Structural vulnerability is a distinct likelihood of encountering major difficulties within the county or community atmosphere or the threat to the county or community itself because of deficient housing or building conditions. While this concept applies to engineered structures and the meeting of building codes and requirements in order to sustain acute natural hazard events, the primary issue in the indicator is physical structure (e.g., buildings), the construction of which usually has not been through the formal building permit process. Such buildings are obviously prevalent in the rural or non-urban areas along the periphery of municipalities. These types of constructions also include old historic buildings. Structural vulnerability generally pertains to the structural elements of building, e.g., load bearing walls, columns, beams, floor and roof. The structure vulnerability indicator in CRSI addresses issues of home overcrowding, age of home, housing unit density, major home construction and functional problems and number of mobile homes in a county or community (Cutter et al. 2008, Dominelli 2013, Henstra 2012, Smoyer 1998).

Indicator: Transportation Infrastructure



Transportation infrastructure refers to the framework that supports our transport system. This includes roads, railways, ports and airports. National and local governments are responsible for the development and maintenance of our transport infrastructure. Transportation infrastructure is the fixed installations that allow vehicular traffic to operate. Transport is often a natural monopoly and a necessity for the public and a critical element of community infrastructure in the event of an acute natural hazard event or the recovery from such an event Linnenluecke et al. 2012, Wedawetta et al. 2010). In the CRSI index, the transportation infrastructure indicator is represented by transportation flow continuity including:

- access to highway entrances and exits
- number of and access to airports
- number of and miles of arterial roads in a county
- collector road lengths
- freight railroads
- heliports
- miles of local roads in a county
- roadway bridge access
- roadway bridge structures in a county
- seaplane bases.

One reviewer questioned the absence of public transit as a metric in this indicator. We agree with the potential importance of public transit to resiliency from an acute natural hazard event. However, public transit was not included in the Transportation Infrastructure indicator for two reasons; one technical and one practical. The technical reason is that public transit is no more part of transportation infrastructure than automobiles. Transportation infrastructure consists of the fixed installations supporting transportation (e.g., roads, railways, terminals). The practical reason is that we considered the inclusion of public transit as a separate indicator but, while there was adequate data for the topic in metropolitan areas, data was sparse or non-existent for nonmetropolitan areas which make up the bulk of the U.S.

Indicator: Utilities Infrastructure

Public utilities are organizations that produce, deliver and maintain the infrastructure for supporting public access to critical public health services and power. Robust utility networks are essential for promoting quality of life during the disaster recovery process (Ma et al. 2018, Panteli and Mancarella 2017, Zimmerman 2017) . Utilities networks are one of the most protected resources within any county or community, but areas that are sparsely populated may lack any redundancy or rerouting options should the main utility service(s) be compromised as a result of an adverse natural hazard event. Within CRSI, the utilities infrastructure indicator describes the relative availability of drinking water, sewer and power services based on number and location.

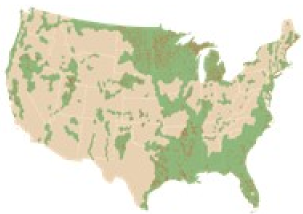
Indicator: Vacant Structures

Vacant structures (residential and non-residential) are generally at greater risk to an acute natural hazard event than occupied structures. This vulnerability is often due to a lack of maintenance, general deterioration and/or owner disinterest. Although not related to acute natural hazard events, these structures are also a matter of increasing concern for fires. For example, Cleveland is plagued by over 12,000 vacant structures including houses, blighted buildings, schools, former manufacturing plants and forgotten warehouses. The issue is of such concern to Detroit (with over 78,000 vacant structures), that the city has demolished nearly 12,000 structures since 2014 resulting in a 25% reduction in vacant structure fires over the past two years (Helms 2016). By removing dangerous vacant buildings and empty houses, safety and quality of life in Detroit is improved. These types of buildings are particularly vulnerable to acute natural hazard events. The CRSI vacant structures indicator includes the number of vacant business structures in a county, the number of vacant residences in the county and the number of other vacant buildings in the county (e.g., hospitals, schools, government buildings).

2.4.5. Natural Environment Domain

The natural environment is a domain that encompasses all living and nonliving things, occurring naturally in the United States. The concept of natural environment can be distinguished by two primary components: 1) complete ecological units that function as natural systems without extensive human inventions (often called ecosystems) and 2) universal natural resources and physical phenomena that lack clear-cut boundaries (e.g., air, water, climate, radiation, magnetism) not originating from anthropogenic activities. In this domain the natural environment is represented by two indicators - the extent of ecosystem type and condition of natural ecosystems and managed lands. Open space and green space are included in appropriate

Indicator: Extent of Ecosystem Types



CRSI addresses the resilience of natural ecosystems as well as the resilience of developed lands and dual-purpose lands. The extent domain is necessary to gauge resilience on the proportion of land that is undeveloped and includes the spatial extent or acreage of each ecosystem type that occurs naturally without any significant human intervention (Adger et al. 2005, Foley et al. 2005, Smit et al. 2000). Some of these measures include:

- wetlands
- forested areas
- deserts
- aquatic areas or "blue space"
- grasslands
- tundra.

Indicator: Condition

CRSI addresses the resilience of natural ecosystems as well as the resilience of developed lands and dual-purpose lands. The condition domain is necessary to gauge the original condition of the proportion of land types or ecosystems that is undeveloped and includes an assessment of the ecological condition of each ecosystem type that occurs naturally without any significant human intervention (Foley et al. 2005, Stenseth et al. 2002, Walther et al. 2002). This condition estimate is based on surveys completed by EPA's Office of Water (USEPA 2017) and Office of Air and Radiation (USEPA 2016a), USDA's Forest Service (USFS 2017) and Natural Resources Conservation Service (NRCS 2017a, b). The condition indicator is related to metrics that describe the following ecological conditions in natural communities and resources:

- biodiversity
- Conditions of aquatic ecosystems condition forests condition
- air condition • soils condition.

Comparison of Differing Versions of CRSI

An earlier version of the CRSI framework was published as a conceptual model (Summers et al. 2017). The earlier conceptual model included five sub-models (risk, governance, social, built environment and natural environment), eleven domains and 25 indicators. The authors believed after further investigation that the domains and the indicators were largely duplicative. In order to maintain the structural integrity of the earlier index framework, the five sub-models were renamed domains. The original domains and indicators where combined to create a single set of well-rounded indicators. These changes did not significantly alter the structure of CRSI but rather introduced a different nomenclature to simplify the CRSI structure.

2.5. Metric Selection and Data Sources

A candidate list of potential metrics was identified based on existing literature and expert opinion. The inventory of metrics was largely driven by the relevancy for measuring natural hazard events and natural hazard impacts, ecological connections of natural systems to built and natural environments and how well the sets of metrics fit as "proxies" for respective indicators. Metric redundancies across the literature were encountered. Over 600 metrics were described in the literature, many of which were duplicative. Based on the data acceptance criteria and other approaches such as autocorrelation analysis, duplicate measures review, etc. the candidate list of metrics was distilled through group consensus and expert counsel. Only the most robust metrics were retained for quantification. Data acceptance criteria are described as follows:
To the extent possible, data sources were selected based on the following criteria:

- Availability and access: The data are publicly available and easy to understand, access and extract.
- Reliability and data credibility: The data owners collected data in a manner that is vetted by the professional community and have metadata available for review.
- Spatial preference: County-level data is preferred spatial unit for population-based information and acres, meters, hydrologic units or similar for geospatial units.
- Coverage: Nationally consistent in scope.
- Chronological history and the likelihood that the data will continue to be collected: Data exhibit a consistent collection history from 2000-2015.
- Types of Data: Subjective and/or objective data specifically relevant for development of CRSI.

Table 2.5 offers a brief overview regarding the indicators and general description for interpretation. Detailed metric information is located in Appendix A.

2.6. Data Handling and Standardization

Acquired raw data used to populate CRSI metrics are maintained as an archive in their original format to help ensure data transparency. Metric data are derived from raw data, are stored in plain text format (e.g., ASCII) and are organized in hierarchical or nested structures that match the CRSI conceptual framework. This data structure allows each level of CRSI data, from raw data to final scores, to be examined either individually or as a whole. The plain text format makes the data not only more available to a variety of softwares (e.g., ESRI ArcGIS®, SAS®, R, JavaScript), but also makes the data more readable.

Table 2.5 List of CRSI domains, indicators, scope and number of metrics. Numbers in parentheses for domains show the total number of indicators/total metrics in the domain.

Domain	Indicators(s)	Metric(s)
Built	Communication Infrastructure	Communication continuity (7)

Domain	Indicators(s)	Metric(s)
Environment (5/24)	Housing Characteristics	Structure vulnerability (5)
	Transportation Infrastructure	Transportation flow continuity (6)
	Utility Infrastructure	Utility Continuity (3)
	Vacant Structures	Structure vulnerability (3)

Domain	Indicators(s)	Metric(s)
Governance (3/5)	Community Preparedness	Community resilience strengthening (2)
	Natural Resource Conservation	Natural resource recovery (1)
	Personal Preparedness	Personal property hazard protection (2)
Natural Environment (2/18)	Condition	Biodiversity, using birds as a proxy (1)
		Coastal condition (1)
		Forest condition (1)
		Inland lake condition (1)
		Percentage of clean air days (1)
		Rivers and streams condition (1)
		Soil growth suitability (1)
		Soil productivity (1)
		Wetlands condition (1)
	Extent of Ecosystem Types	Agriculture area (1)
		Forested area (1)
		Grassland area (1)
		Inland surface water area (1)
		Marine/Estuarine area (1)
		Perennial ice/Snow area (1)
		Protected areas (1)
		Tundra area (1)
		Wetland area (1)
Risk (2/20)	Exposure	Earthquake probability (1)
		Extreme high temperature incidents (1)
		Extreme low temperature incidents (1)
		Flood probability (2)
		Hailstorm probability (1)
		Tornado probability (2)
		Hurricane probability (2)
		Landslide probability (1)
		Major toxics presence (1)
		Non-storm damaging wind incidents (1)
		Nuclear presence (1)
		RCRA sites (1)
		Superfund sites (1)
		Toxic release presence (1)
		Wildfire probability (1)

Domain	Indicators(s)	Metric(s)
	Loss	Developed area loss (includes human and property measures) (1)
		Natural area loss (1)
		Dual-benefit area loss (includes cropland and managed area measures) (1)
Society (8/50)	Demographics	Vulnerable population (5)
	Economic Diversity	Economic stability/recovery (2)
	Health Characteristics	Health problems that may impact personal resilience (9)
	Labor and Trade Services	Construction recovery (8)
	Safety and Security	Provisioning of emergency and civil services (4)
	Social Cohesion	Access to social support (4)
	Social Services	Access provisioning to critical services (15)
	Socio-Economics	Employment opportunity (1)
		Personal economics (2)

A team consensus approach was used to rate every candidate metric as to whether it was or was not a valid measure for a specific indicator. A final comprehensive review of the pool of indicator metrics was performed to identify potential data sources. If data for a metric could be obtained from two or more data sources, then a single source for the metric data was chosen based on the data acceptance criteria. Metric data were averaged across all years of available data. Any remaining data gaps were not imputed for count data, as a rule. Where missing data existed and were not expected (e.g., wetlands condition, scored indicator) then missing value was set to null. If missing data represented a metric where a zero was meaningful, the missing value was set to zero. For geospatial data interpolation methods were used to fill in missing data. The interpolation method varied by metric depending on measurement—aerially-weighted, modeled, etc. Box-and-Whisker analyses were completed for each fully enumerated CRSI metric. Extreme lower and upper outlier measures were set to minimum and maximum values, respectively. The maximum values were calculated to be three times the 75% percentile for each metric and the minimum values were calculated as minus three times the 25% percentile. Any outliers of this three times maximization technique were set to the metric value closest to the fence (Baum et al. 1970). Except for measures presented in percent or proportion, data were standardized on a scale from 0.01 to 0.99 using a min-max normalization process as follows: (p)ˆ= ((x - xmin)/(xmax-xmin)). The resulting CRSI metric data set included measured, modeled and filled standardized data for the 3,135 counties of the U.S. Approximately 1.3 million metric data points were extracted and synthesized to quantify CRSI indicators.

2.7. Calculations

2.7.1. Built Environment, Governance, Natural Environment and Society Domains

Four basic steps were used to summarize metrics to domains (Figure 2.4), except for the Risk domain which will be discussed separately. Indicators and domains were derived using the following approach:

- Metric data were adjusted for age, population or spatial area, as appropriate, prior to standardization (e.g., number of hospitals in a county adjusted by the population of the county). Count information contributing to continuity measures were not weighted.
- Average of related standardized metric values served as the basis for indicator scores • Domain scores were obtained from the sum of appropriate standardized indicator values.
- Domains for built environment, natural environment, society and governance were standardized in preparation for the final CRSI calculation.

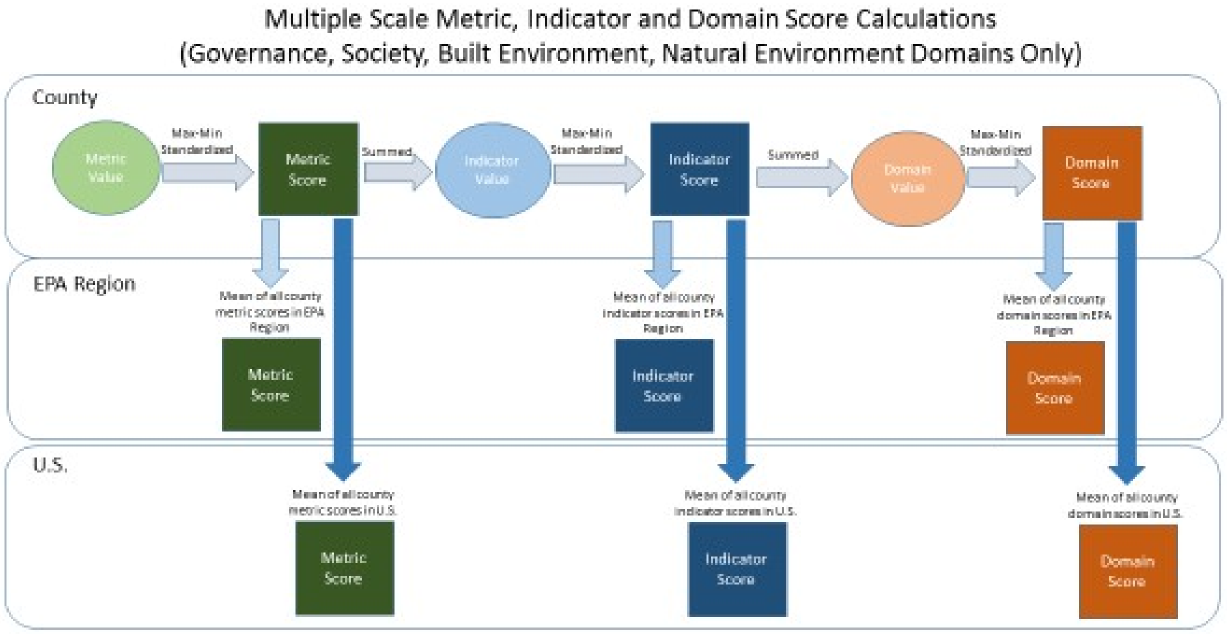


Figure 2.4 Representation of the Metric, Indicator and Domain scores for Governance, Society, Built Environment and Natural Environment Domains of CRSI. For this report, aggregations were made at the EPA regional scales and national scale. Similar aggregations could be accomplished at any appropriate scale (e.g., western regions, intermountain regions, coastal regions).

2.7.2. Risk Domain

The Risk domain is a probabilistic calculation based on geophysical and technological exposure and loss described in Buck et al. 2017. The components include historical exposure, basic likelihood of exposure factor, anthropogenic exposure, and human, property and natural ecosystem losses. All metrics were min-max standardized. A sum of metric values representing incidents of past natural hazard events and exposure likelihood for each county, parish and borough was used as the basis for calculating metric scores for the Exposure Indicator. The Loss indicator was derived from the sum of loss metric scores identified as three land type categories- natural, developed and dual use. The domain measures were calculated as the standardized product of total exposure divided by total loss. The approach used to calculate the Risk domain scores is presented in Figure 2.5.

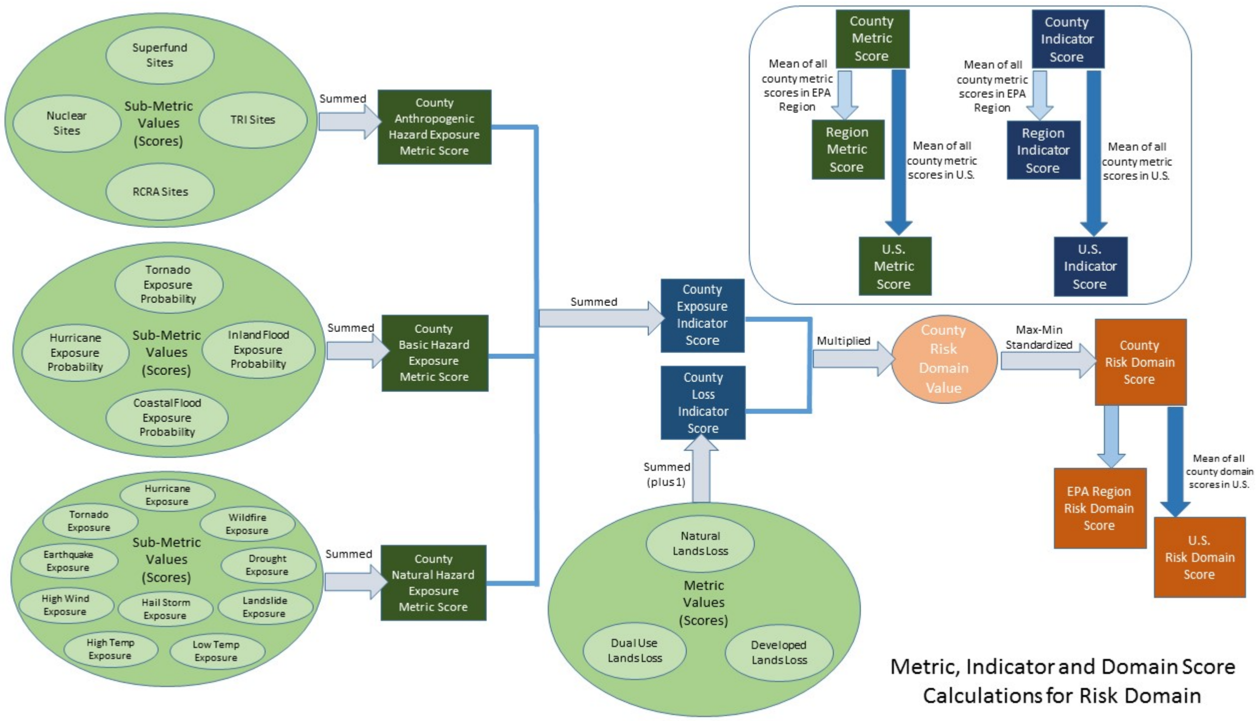


Figure 2.5 Representation of the Metric, Indicator and Domain scores for Risk Domain of CRSI.

2.8. The Final Steps to CRSI

All domains for each county, parish and borough (all referred to as county below) were min-max standardized on a scale from 0.01 to 0.99. The final CRSI calculation begins as a scaled value for recoverability/ vulnerability derived from Governance and Risk (basic CRSI) with the Governance value being adjusted by the remaining domain scores for social, built environment and natural environment to complete the calculation of CRSI as shown below:

$$CRSI(B)_i = R_i / V_i = Gov_i / Risk_i$$

where $CRSI(B)_i$ = value of basic resilience (Recovery/Vulnerability or R_i/V_i) and R_i/V_i = Governance in county i/Risk in county i. The overall CRSI score is calculated as:

$$CRSI_i = (Gov_i + Soc(a)_i Gov_i + BE(a)_i Gov_i + NE(a) i Gov_i) / Risk_i$$

where $CRSI_i$ = the value of CRSI or adjusted resilience for county i and $Soc(a)_i$, $BE(a)_i$, and $NE(a)_i$ are the adjustment multipliers for Society, Built Environment, and Natural Environment in each county i, and $Risk_i$ is the Risk score for county i.

The adjustment factors are calculated as follows:

$$Soc(a)_i = {(Soc_i - Soc_m)}\Big/{Soc_m}$$

where $Soc(a)_I$ is the adjustment multiplier for society in county i, Soc_i is the social domain score for county I and Soc_m is the median social domain score for all counties;

$$BE(a)_i = {(BE_i - BE_m)}\Big/{BE_m}$$

where $BE(a)_I$ is the adjustment multiplier for built environment in county i, BE_i is the built environment domain score for county I and BE_m is the median built environment domain score for all counties;

$$NE(a)_i = {(NE_i - NE_m)}\Big/{NE_m}$$

and where $NE(a)_I$ is the adjustment multiplier for natural environment in county i, NE_i is the natural environment domain score for county I and NE_m is the median natural environment domain score for all counties.

The calculation process is depicted pictorially in Figure 2.5. The domains are weighted equally in the calculation of CRSI in this report. By no means do the domains have to be weighted equally. If communities or counties have specific data to inform CRSI then weights can be added to the final CRSI calculation based on local priorities regarding the domain issues. Even if, no new data is added, domains can be weighted based on local knowledge of priorities.

2.9. Uncertainty Analysis

Uncertainty analyses is recognized as an important step in the presentation of new index frameworks. For CRSI, this analysis will be completed as part of Next Steps for further development of the index.

2.10 Technical Soundness of Approach

The approach used for CRSI is based on a basic method of creating an index to describe current condition and to be used as a screening tool to determine locations in need of improvement to increase resilience to acute natural hazard events. The use of metrics to develop indicators and indicators to develop domains is a standardized approach. The selection of indicators and metrics based on scientific and social literature adds to the technical soundness of the approach. However, there are also limitations. Literature and team technical evaluation suggested several metrics that would be useful in representing the indicators but the decision to develop CRSI at the county level made the use of these metrics impossible as the data representing the metrics do not exist at the county level. Would CRSI likely be improved by their inclusion? Probably. Limitations of data always reduce the power of indices but using the available data certainly provides a screening level of accuracy for CRSI. Reviewers were asked specifically, “Is the approach for the index technically and conceptually sound?" Their responses provide a better measure of the soundness of approach than anything the authors could add:

"Yes, the general technical approach is based on a familiar and common one, in use for several decades to develop indices and compare components in a way to describe the current condition and help stakeholders identify areas to investigate for potential management actions/decisions (i.e., conceptually sound). Polar plots, scatterplots, ranked lists, maps, and examples by county and regions present a useful array of ways to engage stakeholders. A key area in my opinion is Figure 3.1 (now Figure 4.1) where the scatterplot is compared to a 45-degree line – I think the discussion and the figure can be made more impactful by explicitly drawing ellipses/circles on the plot itself and indicating potential management decisions/actions. I do think this document is very clear about distilling and clarifying new thinking around climate resilience. I did not identify any flaws, ..."
--Bruce Duncan Region 10

"The literature review/synthesis is a good approach that takes advantage of existing work." --Megan Sussman, Office of Sustainable Communities

"Yes. Well written and succinct. I like the graphic on pg. 3." (Figure 1-1) --Laura Farris, Region 8

One reviewer felt the report suffers from conceptual under explication as well as a lack of transparency in the operationalization of concepts in the form of measures (Dr. Courtney Flint, Utah State University). While some reviewers felt selected indicators needed further explanation, most appreciated the level of explanation.

The reviewers were also asked: "Do the methods, results and discussion sections adequately describe the index development approach?" and "Are tables and graphics helpful?". Again, their responses provide more information than the authors can provide through additional explanation.

In addition, the responses suggest that the level of detail and explanation is sufficient for EPA Regional staff.

"Yes, from my point of view."
"Resilience Graphics and Tables clear."
--Joyce Stubblefield, Region 6

"Overall, yes, it is straightforward to follow the developmental approach and to see how additional information could be incorporated as new nationally accessible knowledge is developed. I do like the discussion here for a region – the overall comparison and then differences within the region by location and by domain is a good approach. However, as much as I appreciate the evaluation by region, I think there may be some other constructs, but maybe not for this effort. States and Tribal lands come to mind as being particularly useful unless you think county governance tends to outweigh state governance, which it probably does when it comes to land use decisions. I think your discussion around page 35 or so is very helpful example of how the index can be used."
--Bruce Duncan, Region 10

"Yes. I really like the graphic on pg. 12." (now Figure E-2)
--Laura Farris, Region 8

"As for adequately describing the index development approach, my biggest concern is that the operationalization is still a bit of a black box."
--Courtney Flint, Utah State University

3. How to Use CRSI – Its Utility and Potential Applications

3.1. Introduction

The potential for use of the Cumulative Resilience Screening Index (CRSI) is very broad and with additional localized data additions, even broader. Below, the potential uses are outlined by spatial unit (nation, region, county, community) and a few relevant specific examples (e.g., specific risks, specific county comparisons with similar circumstances but different CRSI scores, and comparisons of EPA Regions) are discussed.

Categories of purposes/uses of CRSI include:

- Describing the state of the condition of resilience at the county level and aggregated levels above the county (i.e., the minimal intended use of the index)
- Providing a framework that might be useful for communities to expound upon the county information using county- or community-specific data to create county- or community level resilience scores
- Identifying areas for management/action decisions
- Tracking changes over time at the county, state, region, and national levels (potential use that would really need more research on which elements respond on what time scales to management decisions)
- Improving/further developing/vetting the index (i.e., ORD furthering the research in response to stakeholder identified uses)

The multiple application options discussed below address the utility of CRSI's extension to community decision makers, planners and other potential stakeholders.

3.2. General Broad Use

CRSI is not intended to be "run" based on the information in this report. CRSI has been run and its results provided for all counties in the United States (except for a few boroughs in Alaska and no counties in U.S. Territories) in this report. Users at this point will simply apply the results that are or can be easily provided (e.g., CRSI scores, domain scores, listings, plots of contributions to CRSI score, maps). For any other reasonable information at the county scale and higher, readers can contact the authors of this report and get most information. These available results can provide broad scale comparisons of large areas across the United States. For example, at the national level, the Appalachians, deep South and much of the West Coast states show relatively low governance associated with natural hazard events and higher than average levels of risk to those natural hazard events. The western states show higher CRSI scores than most of the U.S. (i.e., higher resilience) even though its governance levels associated with acute natural hazard events is lower than much of U.S. However, the scores associated with built environment and natural environment are higher than much of the U.S. offsetting the minimal levels of natural hazard event governance. This increases a low to moderate base resilience score (governance/risk) to a moderate to high CRSI score due to strong building codes, lower level of vacant structure, large areas of preserved and conserved lands, and higher levels of insured homeowners.

On a broad scale, EPA regions can be compared to assess which regions (based on the mean of county CRSI scores) have higher levels of resilience and which regions have lower levels. EPA Region 3, 4 and 6 have lower overall levels of natural hazard event resilience based on CRSI scores. This does not mean that all counties in these regions have low scores. In fact, in Region 3, areas in northern Pennsylvania and in Maryland and Virginia on the lower shores of Chesapeake Bay have among the highest CRSI scores in the U.S. and can serve as models with valuable "lessoned learned" for areas of West Virginia with considerably lower CRSI scores. By disassembling the county CRSI scores, counties with low CRSI domain scores can learn from counties with higher scores. Similarly, in Region 4, counties with low governance scores related to natural hazard events often show moderate to high risk to natural hazard events scores. The Region can determine which counties need particular assistance in becoming more resilient to natural hazard events. In Region 6, a region that lists enhancing resilience to natural hazard events as a major goal, lower than average CRSI scores are seen along the Gulf Coast with very high-risk scores in Harris. Brazoria, Jefferson and Chambers counties and low governance scores in all of these counties except Harris County. All of these counties have been major flood victims of Hurricane Harvey. While Harris County a reasonable level of governance associated with natural hazard events, it's natural environment score is very low resulting in a diminution of the governance score (i.e., Harris County has been developing much of its natural acreage leaving small amounts of natural ecosystems to help ameliorate flooding conditions). Aransas County, second landfall of Hurricane Harvey, has a lower risk score with reasonable governance; however, that governance is diminished by a very low built environment score suggesting large numbers of vacant structure, on the whole, older buildings and poorer overall infrastructure for utilities, communications and transportation. These low built environment domain scores suggest that, if the area experienced a major natural hazard event, the county would be a risk to broad scale destruction (as was evidenced in Rockport, TX).
Finally, individual counties can use CRSI scores on a broad scaled to determine nearby or similar counties with better domain scores – finding counties which can be consulted for "lessons learned". Counties may even be able to use CRSI scores and domain scores to pursue federal or state funding for improvement. Most utility benefits for counties and communities are shown below in Section 3.5.

3.3. Use by EPA Regions

This report provides CRSI and domain score information for all counties within an EPA region specifically to allow the regions to assess natural hazard event resilience at the spatial scales of use to them rather than at the national level. The results by Region are shown as composites of the national scores (i.e., average county scores from within the region but based within a national context. This means that counties have the same CRSI and domain scores in the regional analysis as they do in the national analysis. This permits direct comparison of EPA Regions and counties within the regions. While direct regional comparisons may have limited value from some regional perspectives. It does allow Program Offices (see below) to assess comparative regional trends and allows Regions to locate other Regions with higher scores for CRSI or the domains to be assessed as models for improvement. Regional analysis does permit comparisons of the specific counties in their Region and allows the delineation of county CRSI and domain scores to ascertain which counties are in the most need of assistance in selected domains or overall resilience to natural hazard events. For example, EPA Region 4 has a low overall CRSI score due to a number of counties in Alabama and Mississippi with relatively high risk and low governance for natural hazard events. Similarly, these counties also have low society and built environment domain scores further reducing the impact of natural hazard-related governance. In short, the counties have minimal governance related to natural hazard events and, if an event were to strike, these counties do not have the composite skill mixes and demographic characteristics to ensure recoverability. To exacerbate the situation, these counties often have large numbers of vacant structures, less stringent building codes, and older public infrastructure. Examining these attributes of the CRSI and domain scores permits Region 4 decision makers to determine those counties most in need of assistance in developing their resilience to natural hazard events. EPA Regions can ascertain which counties in their jurisdictions are most at risk to natural hazard events overall as well as to individual natural hazard event types. The Regions can also determine which high-exposure or moderate-exposure counties have their risk levels elevated due to the proximity of technological hazards. Harris County, Texas's low risk domain score is the product of the combination of natural hazard exposures and multiple technological hazards (e.g., Superfund sites, RCRA sites, petro-chemical plants). Unfortunately, this exacerbation of risk has proven true in the aftermath of Hurricane Harvey in the Harris County metropolitan and suburb area of Houston with multiple explosions and fires at these types of technological hazards. Similarly, Regions can ascertain the major contributors to CRSI scores at the Regional level as well as the county level.

3.4. Use by EPA Program Offices

EPA Program Offices are most concerned with the establishment of policies and programs across the nation and, as such, are less interested in individual county information. However, Program Offices are interested if whole regions of the United States show relatively poor resilience to natural hazard events and if certain areas of the country demonstrate high exposure to natural hazard events in conjunction with high exposure to technological hazards addressed by EPA. EPA's Office of Land and Emergency Management (OLEM) has a special interest in this union of natural hazard event exposure and technological hazards (e.g., Superfund, RCRA, active waste sites) in its development of guidance and technical assistance to establish safe waste management practices. Knowing the juxtaposition of counties at risk and placement of technology hazards is useful to OLEM for both guidance and organization of clean-up activities resulting from a major waste event.

EPA's Office of Water (OW) ensures that drinking water is safe and restores and maintains watershed and ecosystems to protect human health, support economic and recreational activities, and provide healthy habitats. Drinking water issues were a major problem in the aftermath of Hurricane Katrina and is a major continuing issue in several major Texas cities as a result of Hurricane Harvey. Wildfires can be a major source of watershed devastation, particularly in the West as evidenced by the magnitude and spatial spread of fires during late summer 2017 in California, Arizona, Oregon and Washington. Earthquakes, prominent in the West, can also be source of modified drinking water as well as infrastructure destruction. Through interactions with the ten EPA Regions, state and local governments and American Indian tribes, OW helps to build capacity and resilience for water resources.

EPA's Office of Air and Radiation (OAR) is concerned with air pollution prevention, radiation protection and natural hazard change issues among many other issues. Knowing the juxtaposition of counties with high natural hazard event risk exposure with radiation producing facilities (e.g., nuclear power plants) and chemical producing facilities could be important data for the Office of Atmospheric Programs (OAP). The interaction of natural hazard change indicators and natural hazard event exposure rates as well as recovery rates for regions of the United States could also be of importance.

EPA's Office Community Revitalization (OSR) supports locally led, community-driven efforts to revitalize local economies and attain better environmental and human health outcomes contributing to community sustainability and resilience. Knowing which counties (and communities) display lower resilience to acute natural hazard events could be an important factor in evaluating which resources are placed to contribute to clean air, clean water, and other important resilience goals of communities and counties. OSC is also interested in the development of tools, research and case studies that promote understandings of resilience and sustainability. Finally, the use of shared examples among counties and communities (learning from each other) in order to provide models of behavior and action is one cornerstone for OSC.

3.5. Use by States, Counties, Metropolitan Areas and Communities

The use of CRSI results or CRSI modification is important at the state, county, metropolitan area, and community level. While one could argue that every community is different with regard to its likely exposure to acute natural hazard events, governance associate with natural hazard events and its resilience to natural hazard events, it is clear the counties in much of the United States can set the tone, guidance and often specifics for emergency operations plans, and emergency response to disaster recovery and hazard mitigation (FEMA 2011) even those developed at smaller spatial scales. Emergency and disaster planning involve a coordinated, cooperative process of preparing to match urgent needs with available resources (Alexander 2016). For successful responses to acute natural hazard events, there must be high levels of coordination and continuing cooperation among, federal, state, county and community infrastructures (Plough et al. 2013).

Many states develop basic disaster management plans and require counties to develop comprehensive emergency management plans and county emergency management programs that must comply with the basic plan. Counties often engage with larger communities in the same manner. However, in many cases smaller communities (without significant resources) simply adopt the county plan and jointly administer the plan in their jurisdictions. For example, Florida (a state with significant acute natural hazard event risks) has established a Comprehensive
Emergency Management Plan (CEMP) (FDEM 2016) as the master operations document for the State of Florida establishing a framework through which the state handles emergencies and disasters. The CEMP consists of a basic plan which describes the process for preparedness, response, recovery and mitigation and provides local CEMP compliance criteria (CEMP-001). In the vast majority of counties, the County CEMP drives these activities in all communities within the county. The exceptions are in counties with large metropolitan areas (e.g., Miami, Tampa, Orlando, Jacksonville) which will have their own CEMPs that are required to meet the county criteria. Thus, the county governmental unit becomes a major actor in the resilience of counties and communities to acute natural hazard events. As a result of this necessary cooperation at all levels of government for satisfactory resilience to acute natural hazard events, counties are often the central focus of specific disaster planning and preparedness for all towns, communities and jurisdictions within the specific county. This is the case in Pensacola, FL where responsibility for this type of preparedness and planning and the execution of emergency management falls to Escambia County. Similarly, in Rockport, TX (the site of the second landfall of Hurricane Harvey), one of the primary actors in

emergency planning and response in Aransas County, TX. Therefore, in the majority of cases throughout the U.S., collection of data at the county-level in appropriate and can be augmented by specifics associated with the individual community affected by the event.

CRSI and domain scores at the county-level permit state, county and community planners to ascertain, risks to natural hazard events in their jurisdictions, likelihood of recovery from such an event (resilience), the likely causes of low levels of recovery, and the identification of counties in similar circumstances (similar risk) that have strong resilience scores.

3.6. Examples

Hurricane Harvey

In August 2017, Hurricane Harvey had two landfalls in Texas – Rockport, TX in Aransas County and Port Aransas, TX in Nueces County. In addition, rainfall from Hurricane Harvey resulted in massive flooding in Houston and surrounding areas (Harris and Brazoria Counties) and Beaumont and surrounding areas (Jefferson and Chambers Counties). Some of the worst damage appeared to be in Rockport, a coastal city of about 10,000 that was directly in the storm's path. Many structures were destroyed, and Rockport's roads were littered with toppled power poles. Extensive damage was also registered in Port Aransas, TX (site of the second Texas landfall). It is estimated that it will be a long time before the storm's catastrophic damage is repaired. Flooding in the Houston/ Beaumont areas was the worst in history, displacing millions of people and with flood waters expected to recede over the course of weeks to months. As an exercise, CRSI results were examined (after the fact) to determine the magnitude and likely locations of extensive damage and low resilience along the Texas Gulf Coast (Table 3.1). Of these counties, CRSI scores for Chambers, Harris and Jefferson Counties are significantly below the national average for CRSI suggesting significantly lesser resilience to natural hazard events. In addition to these counties, Aransas and Refugio Counties (first Texas landfall) display low risk domain scores suggesting little recent history of major natural hazard events (until Hurricane Harvey) but both counties have significantly reduced built environment domain scores suggesting that, if an event were to strike these counties, both would suffer significant structural damage due to reduced public infrastructure and large proportions of vacant buildings. Both counties also showed lower than national average levels for the society domain score suggesting that neither county has the skills diversity to easily rebuild and neither have strong security and security infrastructures. Hurricane Harvey also devastated Port Aransas, TX in Nueces County. Nueces County has a significantly higher risk domain score than the national average associated primarily with historical hurricane paths. The county is dominated by Corpus Christi, TX which avoided much of the devastation associated with the hurricane; however, Port Aransas suffered extensive structural damage. Port Aransas is likely much more similar to Rockport, TX in Aransas County which demonstrates a significantly lower than average CRSI score.

The other counties with lower CRSI scores – Harris (1.35), Chambers (1.57) and Jefferson (2.01) – all show high risk domain scores well above the national average. The Harris County risk score is exacerbated by significant technological risks located there (e.g., chemical and oil refinery facilities, Superfund sites). Brazoria County, located southwest of Harris county, has an average CRSI score but a significantly higher than average risk domain score. All three of these counties are at significant risk to flooding and all four counties significantly flooded due to the intense rainfall associated with Hurricane Harvey. Houston (in Harris County) is reported to have had historic flooding than likely did not recede for weeks and, in some cases, months.

Resilience from the flooding in these counties appears to be driven by differing factors based on the CRSI and domain scores. Brazoria County has an average resilience score that appears to be the result simply of a high risk with all the remaining factors reducing the risk and increasing the overall resilience score to 2.70 (about the national average). Harris County, on the other hand, has among the highest risk scores in Texas (0.758) again associated with flooding and several exacerbating factors. The CRSI score for this county is significantly below the national average at 1.35 suggesting recovery from a major event could be a very long process. This lower resilience seems to be driven by a very low natural environment score (0.192) suggesting that increasing development in the last decade and loss of natural lands is significant (particularly to the north and west of Houston). Natural, open lands and wetlands often provide a buffering impact to acute natural hazard events (Alongi 2008, Cai et al. 2011, Kuenzer and Renaud 2012). They are usually damaged but tend to recover quickly while reducing the impact of the event on surrounding populated areas. This low level of natural ecosystems in the Houston area (often replaced by impervious surfaces) would enhance the impact of flooding. Chambers and Jefferson Counties also have high risks levels associated with flooding with both counties displaying significantly lower than average resilience scores (Chambers County – 1.57 and Jefferson – 2.01). However, the remaining domain scores in both counties suggest more rapid recovery than Harris County with Chambers County recovering at a slower rate than Jefferson County.

Table 3.1. CRSI and domain scores for select counties along the Texas Gulf Coast and National Average scores (excluding Alaska); (Bold denotes significantly below national average for CRSI and above national average for domains).

County	Risk	Governance	Built Environment	Natural Environment	Society	CRSI
Aransas	0.180	0.573	0.334	0.522	0.404	3.070
Brazoria	0.602	0.662	0.776	0.549	0.524	2.694
Calhoun	0.217	0.505	0.435	0.490	0.429	2.808
Chambers	0.571	0.615	0.511	0.500	0.440	1.567
Fort Bend	0.411	0.644	0.785	0.420	0.580	3.545
Galveston	0.610	0.753	0.608	0.472	0.408	1.257
Harris	0.758	0.611	0.837	0.192	0.491	1.345
Jackson	0.121	0.586	0.337	0.481	0.538	5.510
Jefferson	0.530	0.534	0.698	0.449	0.521	2.005
Matagorda	0.256	0.545	0.440	0.503	0.431	2.677

County	Risk	Governance	Built Environment	Natural Environment	Society	CRSI
Nueces	0.465	0.639	0.699	0.419	0.477	2.518
Refugio	0.116	0.631	0.266	0.468	0.443	3.961
San Patricio	0.189	0.615	0.489	0.444	0.402	3.860
Victoria	0.141	0.533	0.512	0.510	0.541	6.348
National Average	0.229	0.597	0.393	0.413	0.516	4.321

County Comparisons

Direct comparisons of counties can be made with CRSI. These comparisons might reflect comparisons of counties with "perceived" similarities. Appendix B provides the information necessary to compare counties (i.e., CRSI and Domain Scores). As was done in the above examples, a reader can determine differences between or among counties from the CRSI scores and then determine which domains drive the observed differences. These comparisons would permit the viewer to compare counties with "perceived" similar risks and governance and, if the CRSI scores are different, to determine what drives the differences (e.g., low domain scores in particular areas.

EPA Regional Screening Comparisons

Regional analyses (Table 3.2) and mapping show that EPA Region 10 (15.395) and EPA Region 1 (7.53) have the strongest overall resilience scores with EPA Region 4 (1.443) and EPA Region 3 (2.934) having weaker scores. The remaining six EPA Regions cluster together with moderate scores (3.06 – 6.477). Disassembly of the CRSI scores shows that Region 10 strengths lie in its low risk score which result in a high basic resilience score even though its governance domain score is about the national average. Although average, its governance domain score is more than five times the Region's risk domain score. Region 1 strengths lie in an average governance score in the Nation with below average risk, and above average domain scores for social, built environment and natural environment. On the other hand, Regions 3 and 4 have above average risk domain scores and below average governance related to natural hazard events scores. Driving down these lower basic resilience scores, both regions have below average society domain scores suggesting a poorer population, increased ethnicity (making communication for emergency response more difficult), lower levels of social services, poorer access to health facilities, and higher level of undocumented skilled trade laborers (making an assessment of the abundance of trade labor difficult). Region 4 also has a below average score for its built environment suggesting less stringent building codes, higher levels of vacant structures and weaker levels of public infrastructure especially in Georgia and Alabama.
Overall, the U.S. shows good levels of resilience to acute climatic events. However, analyses demonstrate that selected counties (hundreds of them) with higher levels of risk and low levels of

governance can improve their resilience by specifically addressing issues associated with the governance, built environment, natural environment, and society domains. CRSI, which is meant to be a screening tool, provides those directions investment, assistance and action by the EPA Regions and Program Offices.

Table 3.2. CRSI and domain scores for EPA Regions with National Average scores (including Alaska); (Bold denotes significantly below national average for CRSI, significantly above national average for risk domain and simply below national average for remaining domains which results in negative adjustment factors).

EPA Region	Risk	Governance	Built Environment	Natural Environment	Society	CRSI
Region 1	0.240	0.660	0.492	0.445	0.599	7.530
Region 2	0.308	0.658	0.469	0.385	0.520	3.839
Region 3	0.272	0.571	0.382	0.378	0.512	2.934
Region 4	0.255	0.443	0.342	0.403	0.414	1.443
Region 5	0.222	0.696	0.407	0.434	0.572	5.476
Region 6	0.239	0.584	0.394	0.422	0.474	3.060
Region 7	0.209	0.683	0.358	0.380	0.609	4.469
Region 8	0.162	0.685	0.398	0.395	0.617	6.477
Region 9	0.235	0.551	0.620	0.469	0.480	5.524
Region 10	0.137	0.660	0.478	0.531	0.492	15.395
National Average	*0.229*	*0.597*	*0.393*	*0.413*	*0.516*	*4.321*

4. Results and Discussion – National and EPA Regions

4.1. Organization of Results

The results of the CRSI application are shown in this section as a series of maps and graphics that delineate CRSI scores, first across the national and then across all ten EPA Regional scales. Each series for each of the scales consists of the same six maps and two graphics: one map for overall

CRSI county results; five maps depicting county results for each of the CRSI domains (Overall Risk, Governance, Built Environment, Natural Environment and Society); and two graphics that break down the index to demonstrate the contributions of the five domains and the 20 indicators to the overall CRSI score. This disassembly of the index within the EPA Regions allows each region to assess the most significant contributors to strong and/or weak resilience to natural hazard events.

Results from the national scale CRSI scores are further examined to explore how basic resilience (governance/risk) relates to governance. This is accomplished by analyzing the number of counties, represented in a 5x5 matrix depicting the quintiles of governance and overall risk domain scores. This matrix ranges from low-low (lowest 20% risk and governance) to high-high (highest 20% risk and governance). This analysis examines whether the distribution of basic resilience in the U.S. is characterized by greater risk scores being matched by greater governance scores. Similarly, the analysis assesses the number of counties with high levels of governance but low levels of risk as well as counties with low levels of governance but high levels of risk. Counties in either of these categories would be of interest to EPA Regions as areas of potential investment (low governance and high risk) or areas to understand the level of governance investment given the low level of risk (high governance and low risk).

4.2. General Broad Analyses and Results of Basic Resilience (Governance/Risk)

An initial analysis was performed to assess whether the CRSI results associated with basic resilience (governance and risk) varied in a predictable way. Plotting the domain values of risk vs. governance would, from a policy standpoint, be expected to have a positive relationship – greater risk should be accompanied by greater governance. This was tested in three ways: (1) assessment analysis of risk domain versus governance domain scores, (2) examination of the number of counties in the quintiles of risk versus governance (i.e., the number of counties in each quintile combination and testing for expectation using a chi-squared test) and (3) mapping the 25 quintile combinations to examine potential patterns.

An assessment of risk domain versus governance domain is the governance/risk ratio. The expected result of the assessment is a 45 degree angle from low risk-low governance to high risk high governance. This finding would demonstrate that governance is developed in proportion to likely risk (i.e., if you experience high risk there are governance activities/structures in place to counter act that risk). Significant deviation from this finding could reflect an under- or over-reaction to likely risk in terms of governance activities. Placing results into quantiles allows characterization of clusters of counties as over- or under-reacting to risk in terms of governance. In this categorical relationship, generally any combination of risk and governance along the 45 degree angle (slope=1.0) plus or minus one category would be in the expected range. A combination of high risk and low governance would suggest under-reacting, where as or low risk and high governance would suggest over-reacting (new figure showing categories). Mapping these risk-governance ratio categories by county demonstrates any clustering throughout the U.S. to detect spatial trends.

The assessment results based on normalized risk and governance domain are shown in Figure 4.1. These results indicate that for the U.S. the governance score is generally higher than the risk score;

however, 206 counties (6.6% of U.S. counties) have risk scores greater than their governance scores. This suggests that governance activities in the majority of counties outweigh the risk of exposure to extreme natural hazard events.

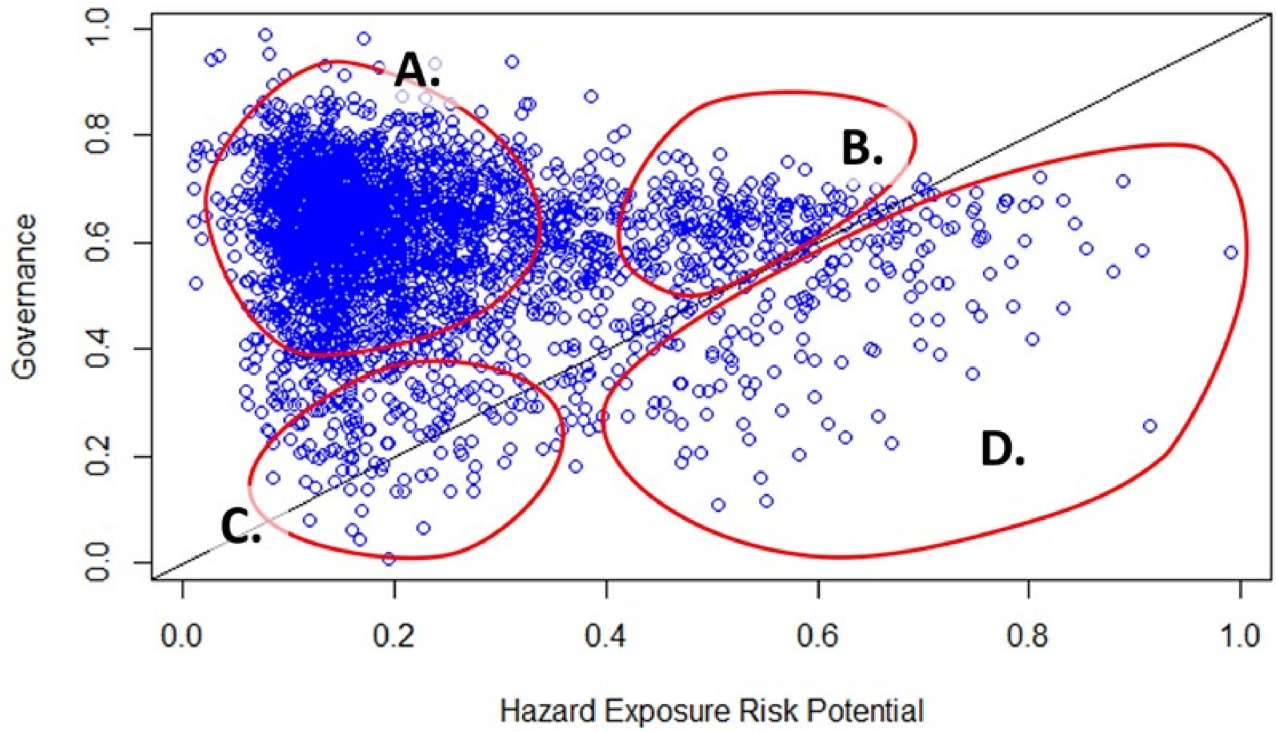


Figure 4.1 Linear assessment of risk versus governance based on domain scores. Ellipses represent differing management implications with A: Low Risk-High Governance (little increased governance necessary other than improvements for selected below-average indicators; B: High Risk-High Governance (likely appropriate governance but any improvement in below-average indicators a likely improvement to resilience); C: Low Risk-Low Governance (likely appropriate governance for level of potential risk; D: High Risk-Low Governance (improvements to governance and indicator of the CRSI domains necessary)

Figure 4.2 shows the county data from the assessment analysis distributed across the categories of risk-governance. For the majority of counties, risk is clustered in the second and third quintiles, while governance clustered between the third and fourth quintile. While this result is positive for the U.S., it can be misleading. The result may occur because the risk of exposure to extreme natural hazard events clusters largely in the second quintile demonstrating relatively low risk while governance clusters in the fourth quintile giving the appearance of "excessive" governance. To account for this, the distribution of basic risk among the counties was examined using a min-max of risk-governance based on the distribution of the county scores to determine the roughly 500-1000 counties with the largest risk to governance disparities (Figure 4.3). These disparities focus on those counties with lower risk and higher governance ratios and higher risk and lower governance allowing the identification of counties where increased governance might be beneficial.

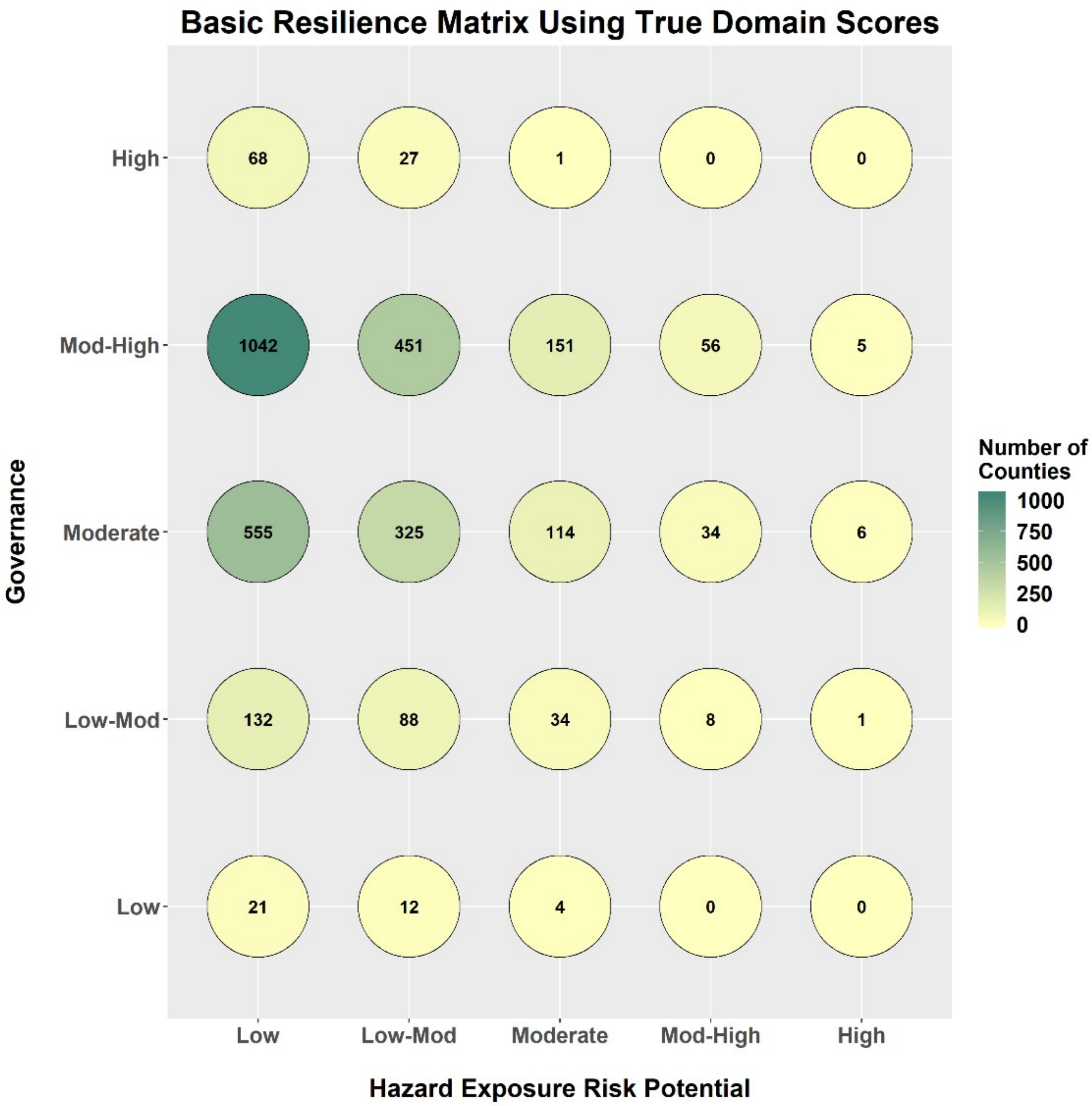


Figure 4.2 Distribution of number of counties in quartiles for risk and governance domains based on the domain scores.

These county min-max scores were mapped to explore the spatial distribution of the quintiles for any potential trends (Figure 4.3). Areas with the highest governance to risk ratio tend to be in the northeast and scattered through midwest and Wisconsin. Areas with the lowest governance to risk ratios appear along the west coast, and in northern and eastern North Dakota. Twenty-two counties (<1% of total) showed very high risk scores coupled with very low governance scores. These counties are in EPA Region 4 (8 – Alabama, Florida, Georgia and Tennessee), EPA Region 6 (8 – Arkansas, Louisiana, Oklahoma and Texas), EPA Region 7 (2 – Missouri and Nebraska) and EPA Region 9 (4 – California). This clustering of the min-max scores needs to be investigated to see if spreading out the clusters creates a better understanding of the risk versus governance interactions.

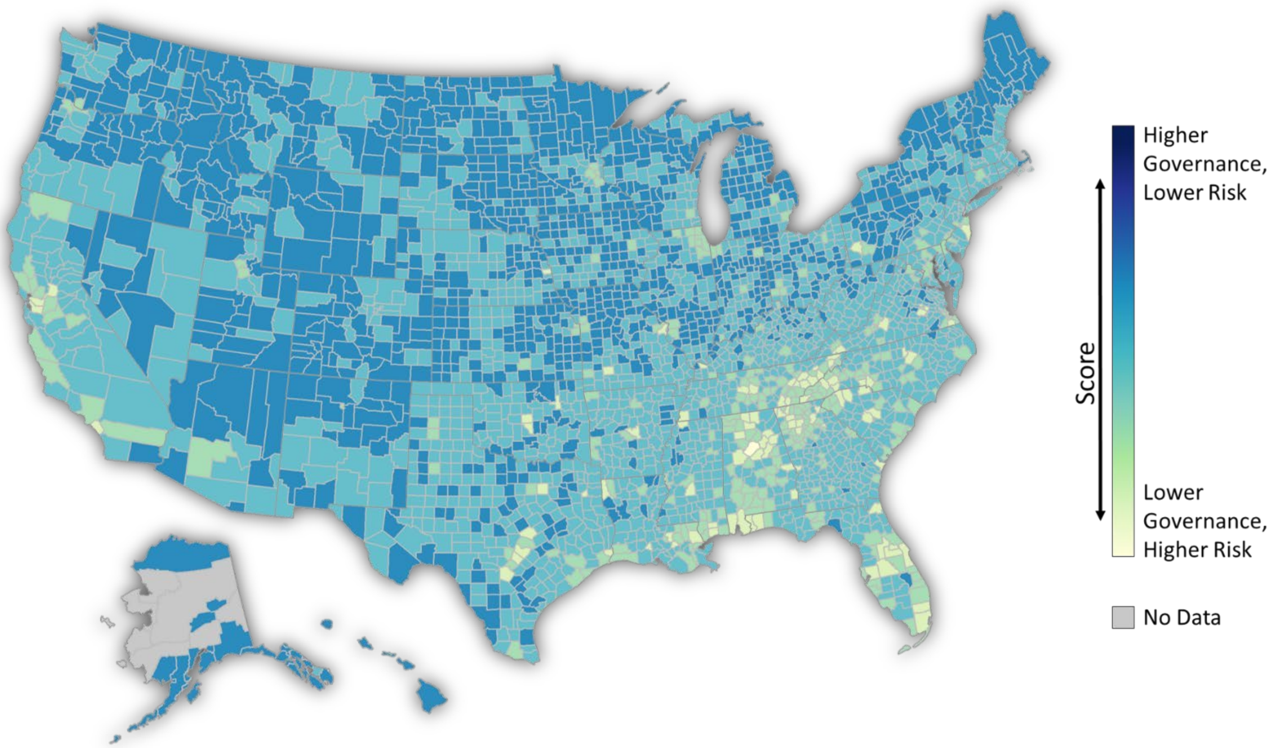


Figure 4.3 Map of the distribution of county scores for basic resilience.

Figure 4.4 redistributes the scores in Figure 4.2 to "spread out" the variability of both the risk and governance scores. This helps to identify the counties where the greatest return can be expected for the governance investment dollar. This redistribution identifies 487 counties where low governance investment will show a modest increases in resilience; the 373 counties where moderate investment in governance should result in moderate increases in resilience; and the 355 counties (including the original 206 counties described above) where greater investment in governance should result in the highest increases in resilience. Approximately 1204 counties would benefit in a small way from further governance investment while 728 counties would not really benefit from increased resilience from further investment in governance activities.

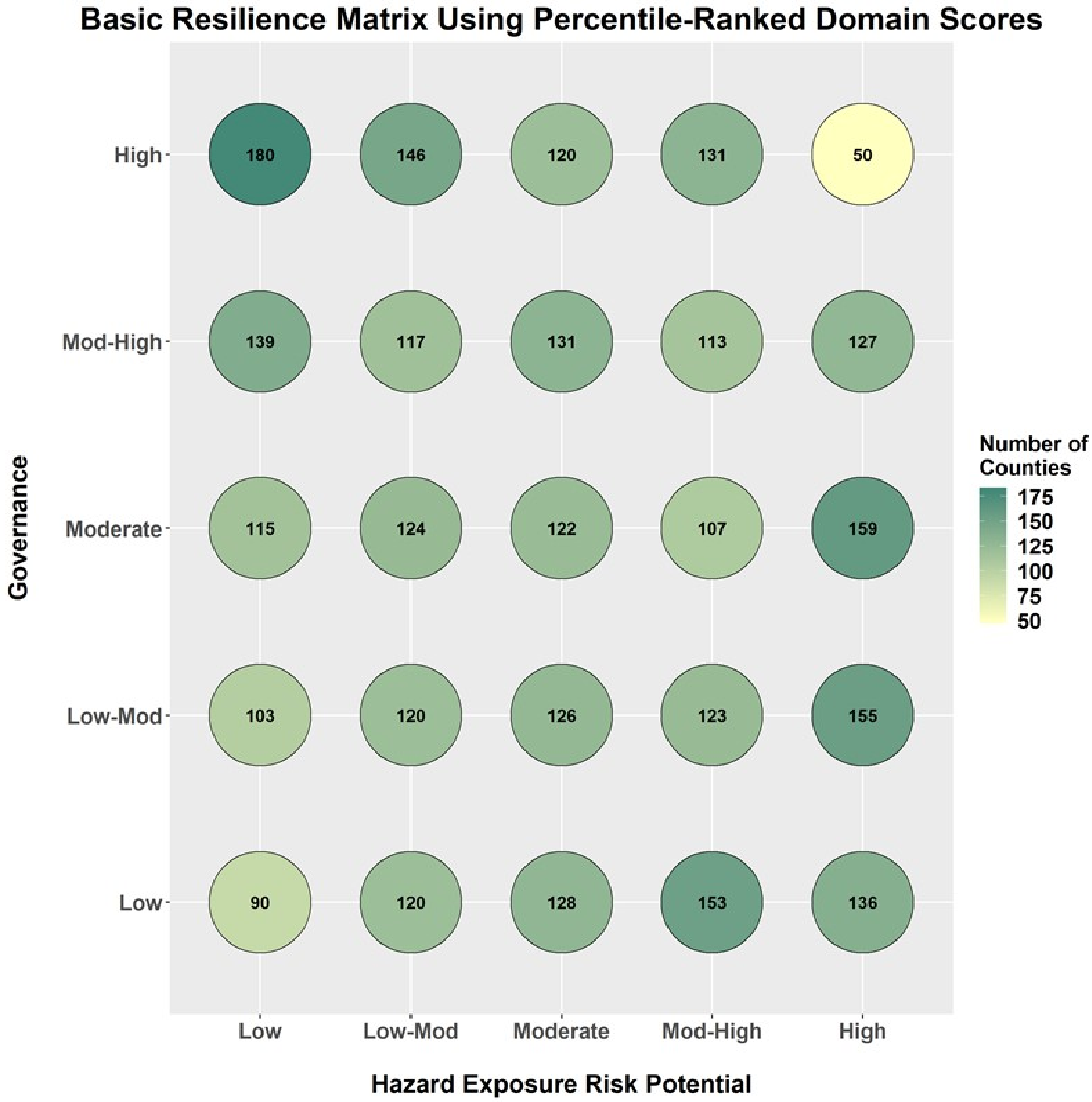


Figure 4.2. Distribution of number of counties in quartiles for risk and governance domains based on number of samples (redistributing the basic resilience scores

The spatial distribution of these counties is shown in Figure 4.5. The areas with the highest and lowest governance to risk ratios remain consistent with Figure 4.3 (as expected). Throughout the eastern seaboard the ratio of scores is moderate governance to higher risk, as are the Ohio Valley area and Great Lakes region. Lower governance to moderate risk ratios are seen through much of the midwest and the northwest (east of the Cascades). In addition to the west coast, the lowest ratios are seen in much of California, Indian country, Arizona, Nevada, and Utah.

Basic resilience can be modified by social activities and structures, the built environment and the natural environment to represent overall resilience (the CRSI score). If these attributes are strong then resilience (mainly through recoverability) can be enhanced. If these attributes are weak then resilience for a area can be deterred. The next sections will examine basic resilience as modified by these factors for the nation and each EPA region.

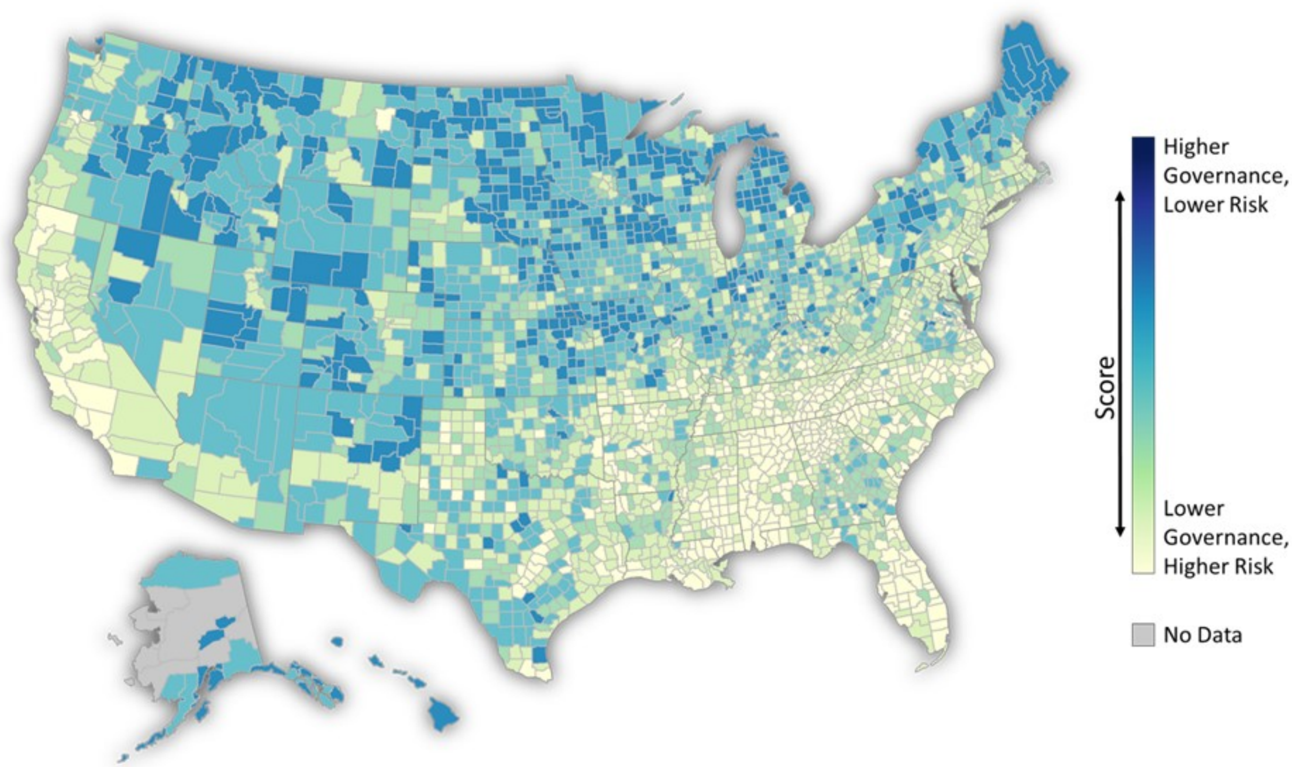


Figure 4.3 Map of the re-distribution of counties to demonstrate the likelihood of increased resilience with increased governance.

4.3 Presentation of Results

Results in the following sections are organized by spatial sub-division (nation and EPA regions). Figures 4.6-4.10 provide information to interpret the results in the graphics presented for the sub-divisions. Each national and regional section includes:

- Figure 4.6: CRSI and Domain score bar graph depicting the scores and the adjustment values for the Society, Built Environment and Natural Environment domains.
- Figure 4.7: Six-panel maps showing the distribution of the CRSI and domain scores by county.
- Figure 4.8: Table of the highest ~5% of CRSI values.
- Figure 4.9: Characterization of the Risk Domain with breakdowns of the exposure and loss indicator scores.
- Figure 4.10: Polar bar plots describing the contributions of the indicators to the domain scores. These plots show the scores for each indicator with the five domains. Longer bars represent higher scores; shorter scores represent lower scores. The polar plots show the contribution of indicator scores to the domain score.

Discussion of results follow the graphic results in each section. All CRSI and domain scores for each region by state and each region by state and county are listed in Appendices B and C.

4.3.1. CRSI and Domain Score Bar Graphs

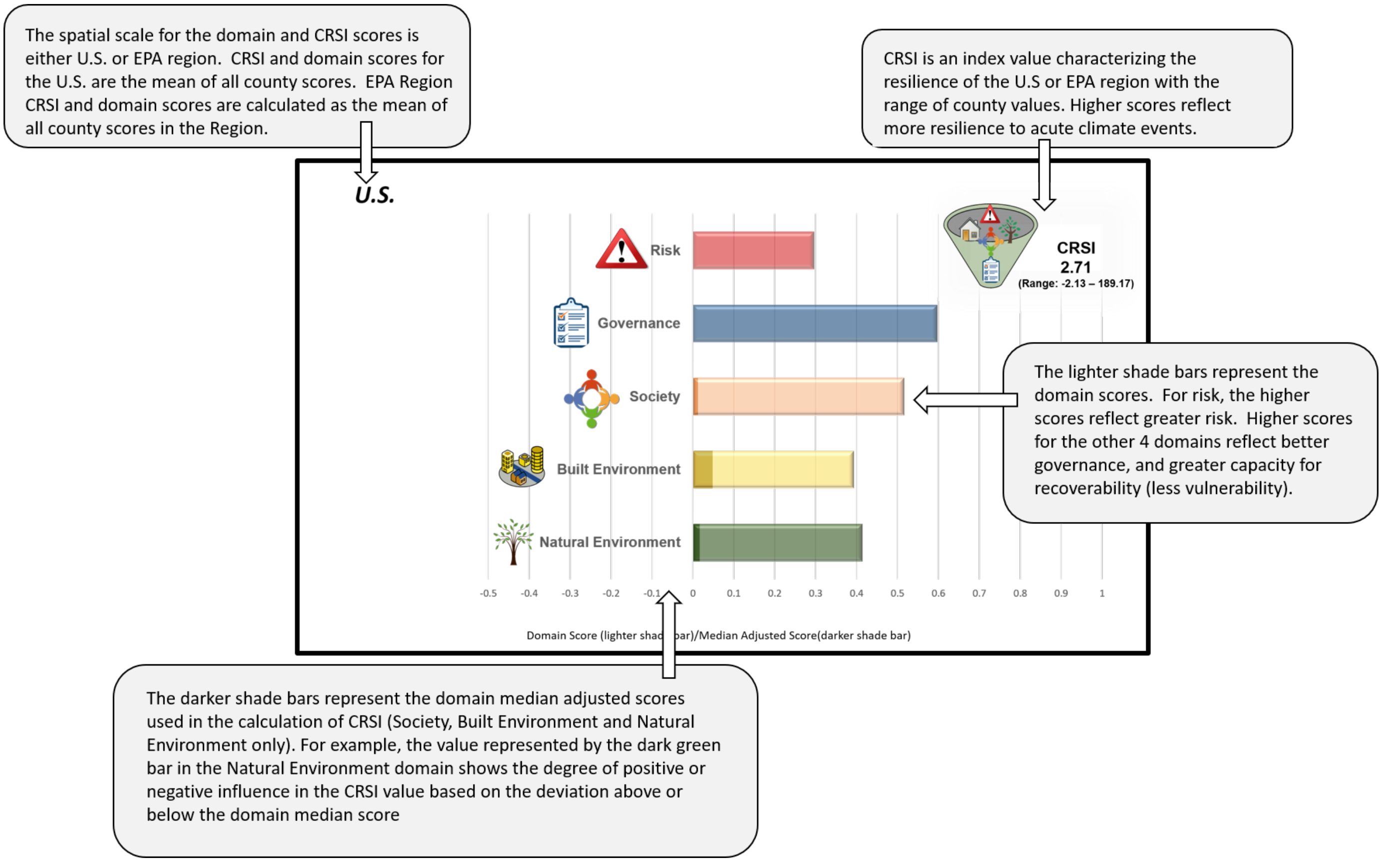


Figure 4.6 Example summary of CRSI and domain available for the nation and each EPA region.

4.3.2. Six Panel Maps

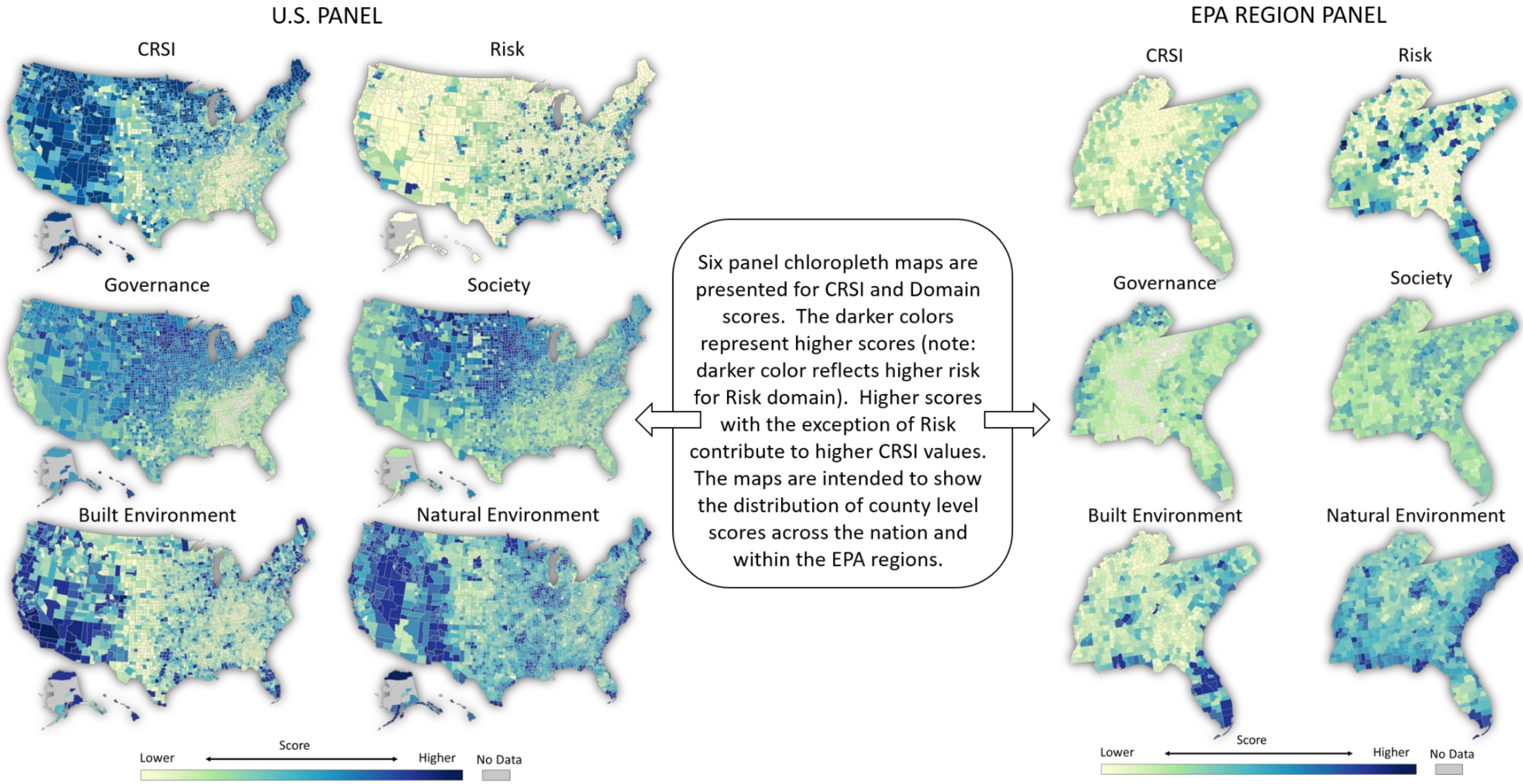


Figure 4.7 Example of six-panel maps showing the distribution of county-level CRSI and domain scores available for the nation and for the EPA Regions.

4.3.3. Top County CRSI Values

Rank	County	EPA Region	Rank	County	EPA Region	Rank	County	EPA Region
1.	Kodiak Island Borough, Alaska	Region 10	51.	Skagway Municipality, Alaska	Region 10	101.	St. Louis County, Minnesota	Region 5
2.	Juneau City and Borough, Alaska	Region 10	52.	Oneida County, Wisconsin	Region 5	102.	Washington County, Vermont	Region 1
3.	Ketchikan Gateway Borough, Alaska	Region 10	53.	Pipestone County, Minnesota	Region 5	103.	Pulaski County, Indiana	Region 5
4.	Aleutians East Borough, Alaska	Region 10	54.	Price County, Wisconsin	Region 5	104.	Baker County, Oregon	Region 10
5.	North Slope Borough, Alaska	Region 10	55.	Clark County, Wisconsin	Region 5	105.	McLean County, North Dakota	Region 8
6.	Haines Borough, Alaska	Region 10	56.	Lamoille County, Vermont	Region 1	106.	Grant County, New Mexico	Region 6
7.	Prince of Wales-Hyder Census Area, Alaska	Region 10	57.	Uinta County, Wyoming	Region 8	107.	Caledonia County, Vermont	Region 1
8.	Hancock County, Maine	Region 1	58.	Day County, South Dakota	Region 8	108.	Sweetwater County, Wyoming	Region 8
9.	Sitka City and Borough, Alaska	Region 10	59.	Koochiching County, Minnesota	Region 5	109.	Wrangell City and Borough, Alaska	Region 10
10.	Hoonah-Angoon Census Area, Alaska	Region 10	60.	San Juan County, New Mexico	Region 6	110.	Huron County, Michigan	Region 5
11.	Waldo County, Maine	Region 1	61.	Ravalli County, Montana	Region 8	111.	Lake County, Minnesota	Region 5
12.	Dukes County, Massachusetts	Region 1	62.	Coconino County, Arizona	Region 9	112.	Kalkaska County, Michigan	Region 5
13.	Dillingham Census Area, Alaska	Region 10	63.	Lincoln County, Maine	Region 1	113.	King William County, Virginia	Region 3
14.	Kenai Peninsula Borough, Alaska	Region 10	64.	Pitkin County, Colorado	Region 8	114.	Morrison County, Minnesota	Region5
15.	Petersburg Census Area, Alaska	Region 10	65.	Blaine County, Idaho	Region 10	115.	Umatilla County, Oregon	Region 10
16.	Fairbanks North Star Borough, Alaska	Region 10	66.	Beaverhead County, Montana	Region 8	116.	Missoula County, Montana	Region 8
17.	Yakutat City and Borough, Alaska	Region 10	67.	Pembina County, North Dakota	Region 8	117.	Franklin County, Maine	Region 1
18.	Maui County, Hawaii	Region 9	68.	Gunnison County, Colorado	Region 8	118.	Deschutes County, Oregon	Region 10
19.	Bonner County, Idaho	Region 10	69.	Chaffee County, Colorado	Region 8	119.	Teton County, Montana	Region 8
20.	Aleutians West Census Area, Alaska	Region 10	70.	Benton County, Indiana	Region 5	120.	Lewis County, New York	Region 2
21.	Bristol Bay Borough, Alaska	Region 10	71.	Honolulu County, Hawaii	Region 9	121.	Cass County, Minnesota	Region 5
22.	Hamilton County, New York	Region 2	72.	St. Lawrence County, New York	Region 2	122.	Jasper County, Indiana	Region 5
23.	Flathead County, Montana	Region 8	73.	Essex County, Vermont	Region 1	123.	Jackson County, Wisconsin	Region 5
24.	Anchorage Municipality, Alaska	Region 10	74.	Shawano County, Wisconsin	Region 5	124.	Polk County, Wisconsin	Region 5
25.	Latah County, Idaho	Region 10	75.	Sierra County, New Mexico	Region 6	125.	Winneshiek County, Iowa	Region 7
26.	Washington County, Maine	Region 1	76.	San Miguel County, Colorado	Region 8	126	Summit County, Colorado	Region 8
27.	Valley County, Idaho	Region 10	77.	Ward County, North Dakota	Region 8	127.	Livingston County, Illinois	Region 5
28.	Addison County, Vermont	Region 1	78.	Routt County, Colorado	Region 8	128.	Huntingdon County, Pennsylvania	Region 3
29.	Knox County, Maine	Region 1	79.	Chickasaw County, Iowa	Region 7	129.	Valdez-Cordova Census Area, Alaska	Region 10
30.	Lincoln County, Minnesota	Region 5	80.	Jefferson County, Montana	Region 8	130.	Elko County, Nevada	Region 9
31.	Roberts County, South Dakota	Region 8	81.	Newton County, Indiana	Region 5	131.	Clayton County, Iowa	Region 7
32.	Kauai County, Hawaii	Region 9	82.	Forest County, Wisconsin	Region 5	132.	Wasco County, Oregon	Region 10
33.	Penobscot County, Maine	Region 1	83.	Sawyer County, Wisconsin	Region 5	133.	Deuel County, South Dakota	Region 8
34.	Pierce County, Nebraska	Region 7	84.	Grant County, Minnesota	Region 5	134.	Rio Arriba County, New Mexico	Region 6
35.	Aroostook County, Maine	Region 1	85.	Ouray County, Colorado	Region 8	135.	Luna County, New Mexico	Region 6
36.	Carbon County, Wyoming	Region 8	86.	Oceana County, Michigan	Region 5	136.	Nez Perce County, Idaho	Region 10
37.	Itasca County, Minnesota	Region 5	87.	Sanders County, Montana	Region 8	137.	Newaygo County, Michigan	Region 5
38.	Lake and Peninsula Borough, Alaska	Region 10	88.	Piscataquis County, Maine	Region 1	138.	Tioga County, Pennsylvania	Region 3
39.	Hawaii County, Hawaii	Region 9	89.	Vilas County, Wisconsin	Region 5	139.	Sanilac County, Michigan	Region 5
40.	Rutland County, Vermont	Region 1	90.	Eagle County, Colorado	Region 8	140.	La Plata County, Colorado	Region 8
41.	Somerset County, Maine	Region 1	91.	Fillmore County, Minnesota	Region 5	141.	Duchesne County, Utah	Region 8
42.	Grand Isle County, Vermont	Region 1	92.	Otero County, New Mexico	Region 6	142.	Missaukee County, Michigan	Region 5
43.	Boundary County, Idaho	Region 10	93.	Garfield County, Colorado	Region 8	143.	Idaho County, Idaho	Region 10
44.	Lincoln County, Montana	Region 8	94.	Grant County, South Dakota	Region 8	144.	Union County, Oregon	Region 10
45.	McKinley County, New Mexico	Region 6	95.	Navajo County, Arizona	Region 9	145.	Lassen County, California	Region 9
46.	Daniels County, Montana	Region 8	96.	Merrimack County, New Hampsh	Region 1	146.	Benewah County, Idaho	Region 10
47.	Grafton County, New Hampshire	Region 1	97.	Door County, Wisconsin	Region 5	147.	Ashland County, Wisconsin	Region 5
48.	Mono County, California	Region 9	98.	Steuben County, New York	Region 2	148.	White Pine County, Nevada	Region 9
49.	Coos County, New Hampshire	Region 1	99.	Florence County, Wisconsin	Region 5	149.	Windham County, Vermont	Region 1
50.	San Juan County, Washington	Region 10	100.	Washburn County, Wisconsin	Region 5	150.	Humboldt County, California	Region 9

A table including counties with the top 150 CRSI values in the U.S. follows the chloropleth maps. Counties are color-coded by EPA Region. For the EPA Regions, the table includes counties with the top 25 CRSI values in each Region.

Region 7	
Rank	County
1.	Pierce County, Nebraska
2.	Chickasaw County, Iowa
3.	Winneshiek County, Iowa
4.	Clayton County, Iowa
5.	Fayette County, Iowa
6.	Wabaunsee County, Kansas
7.	Nodaway County, Missouri
8.	Marshall County, Kansas
9.	Ottawa County, Kansas
10.	Macon County, Missouri
11.	Miami County, Kansas
12.	Richardson County, Nebraska
13.	Bremer County, Iowa
14.	Nemaha County, Kansas
15.	Washington County, Kansas
16.	Shelby County, Iowa
17.	Washington County, Iowa
18.	Osage County, Missouri
19.	Kossuth County, Iowa
20.	Cherokee County, Iowa
21.	Lafayette County, Missouri
22.	Pottawatomie County, Kansas
23.	Brown County, Kansas
24.	Cedar County, Iowa
25.	Vernon County, Missouri

Figure 4.8 Example Table of highest ranking CRSI values for all U.S. counties and counties within EPA Regions. All state and county CRSI scores can be found in Appendices B and C.

4.3.4. Breakdown of the Risk Domain

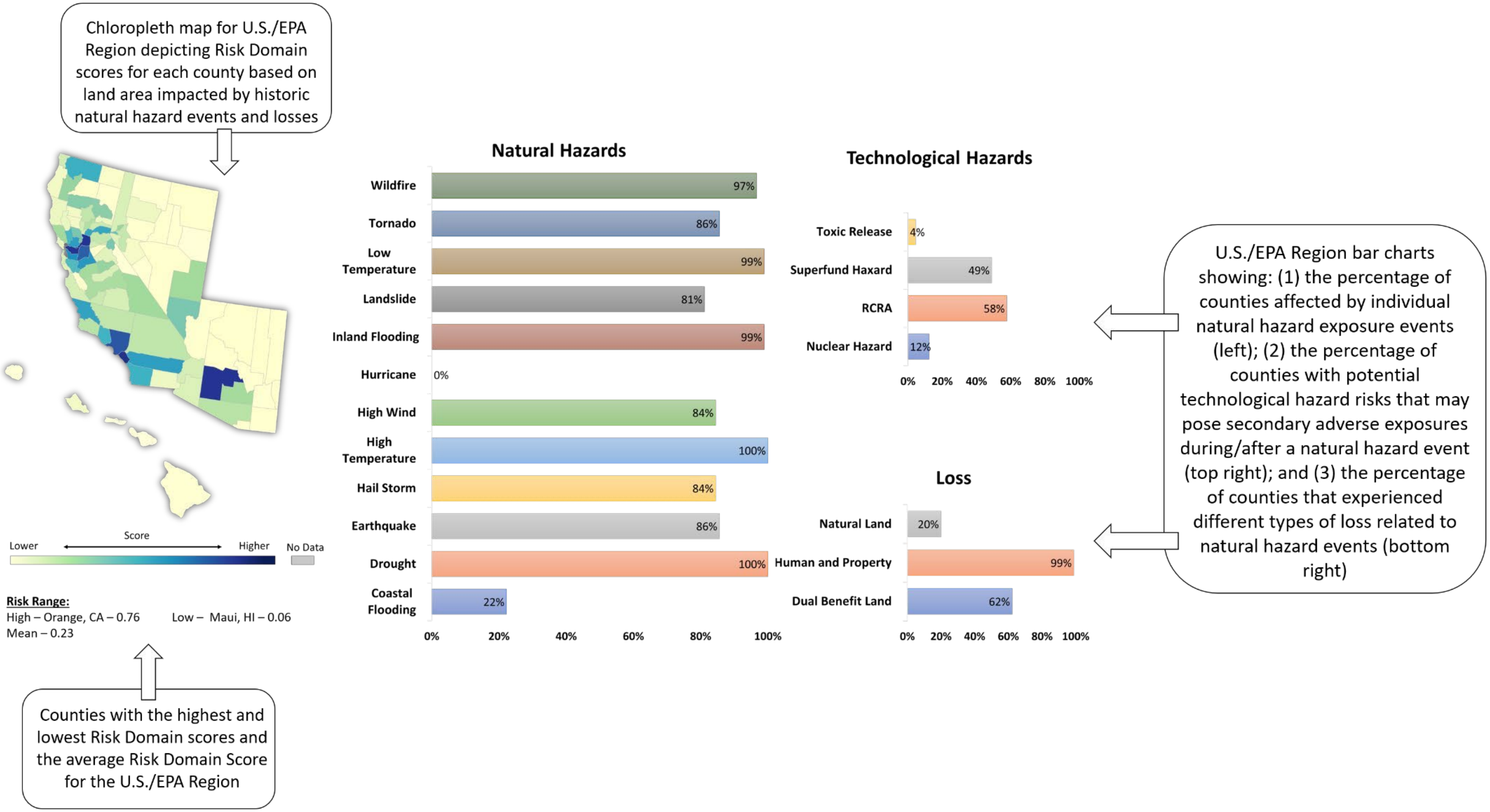


Figure 4.9 Example summary of Risk domain presented for the nation and the EPA Regions.

4.3.5. Polar Plots for Nation and EPA Regions

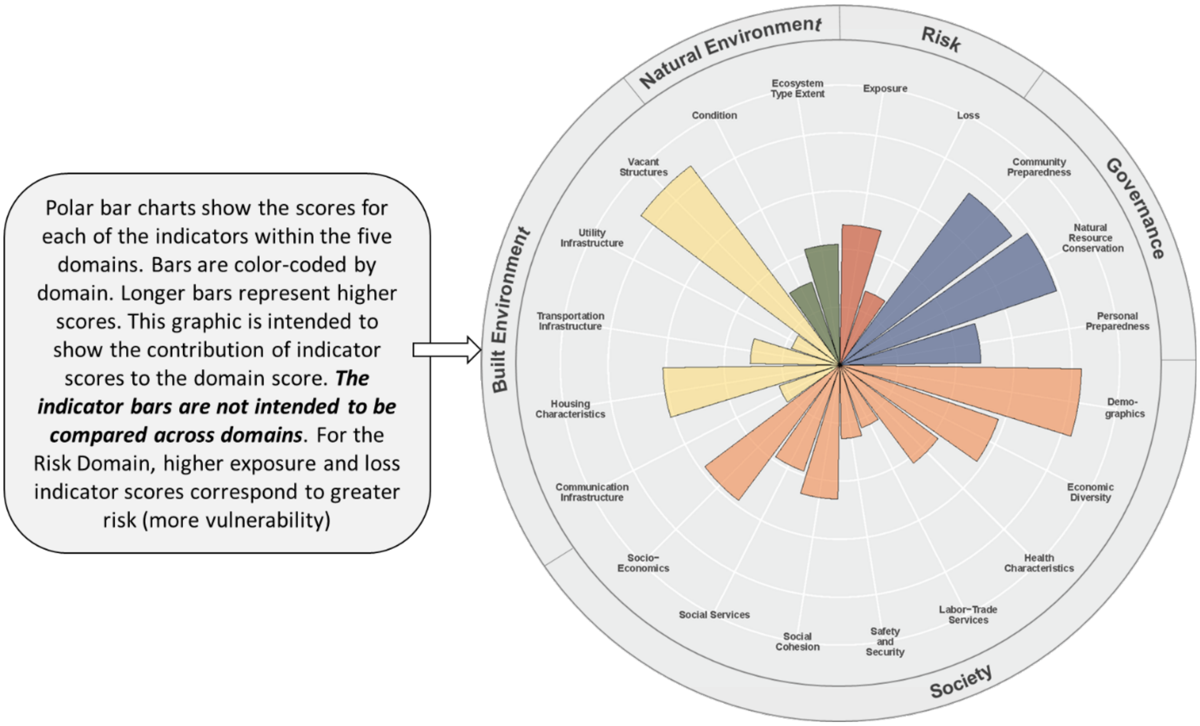


Figure 4.10 Example polar plot describing the contributions of the 20 indicators to the domain scores.

4.3.6. National Results

The U.S. is comprised of 3,143 boroughs and counties. The Cumulative Resilience Screening Index (CRSI) includes 3,135 counties; excluding eight boroughs from Alaska. These eight boroughs could not be included because they had too little data and metric values could not be imputed or interpolated accurately. With the increase in the frequency and severity of natural hazard events over the last decade (e.g., Hurricanes Katrina, Ivan and Rita; Superstorm Sandy; increases in flooding, hailstorms, and wildfires; increases in maximum temperatures; and decreases in minimum temperatures), many U.S. Federal Agencies (e.g., FEMA, U.S. EPA, DOC and DOI) have been assisting states prepare for these types of natural hazard events. The U.S. CRSI score is 4.32 based on the average of CRSI scores for all counties in the U.S. ranging from -2.13 to 35.4 (including Alaska increases the max to 189.17).

The CRSI and domain scores for the nation are shown in Figure 4.11. The nation is characterized by moderate risk, moderate to high Governance, moderate to high Society, Built Environment. The distribution of overall CRSI values as well as the domain scores by county for the U.S. are shown in Figure 4.12. Examples of inferences that can be made from the maps are:

- The western U.S., the Great Lakes area and the upper northeast have higher CRSI values (higher resilience to natural hazard events).
- The western mid-west, the southeast, western Texas and Appalachian region have lower CRSI values.

- The lower northeastern coastal area, southeast/Gulf coasts, a small area associated with southern Lake Michigan, and southern California have the highest risk domain scores albeit for different types of risk.
- Lower risk scores are seen in the west and upper mid-west, Alaska and Hawaii.
- Higher Governance scores are seen in the northeast, mid-Atlantic and Great Lakes areas of the U.S.
- Lower Governance scores related to natural hazard were observed in Appalachia, the deep south and much of California.
- Higher Society scores are seen in the upper mid-west and mountain west.
- Lower Society scores are seen in Appalachia and the deep south. Both Built and Natural Environment domain scores were higher in the west and lower in the western Midwest and southeast.

Many other inferences can be determined from the mapped distributions.

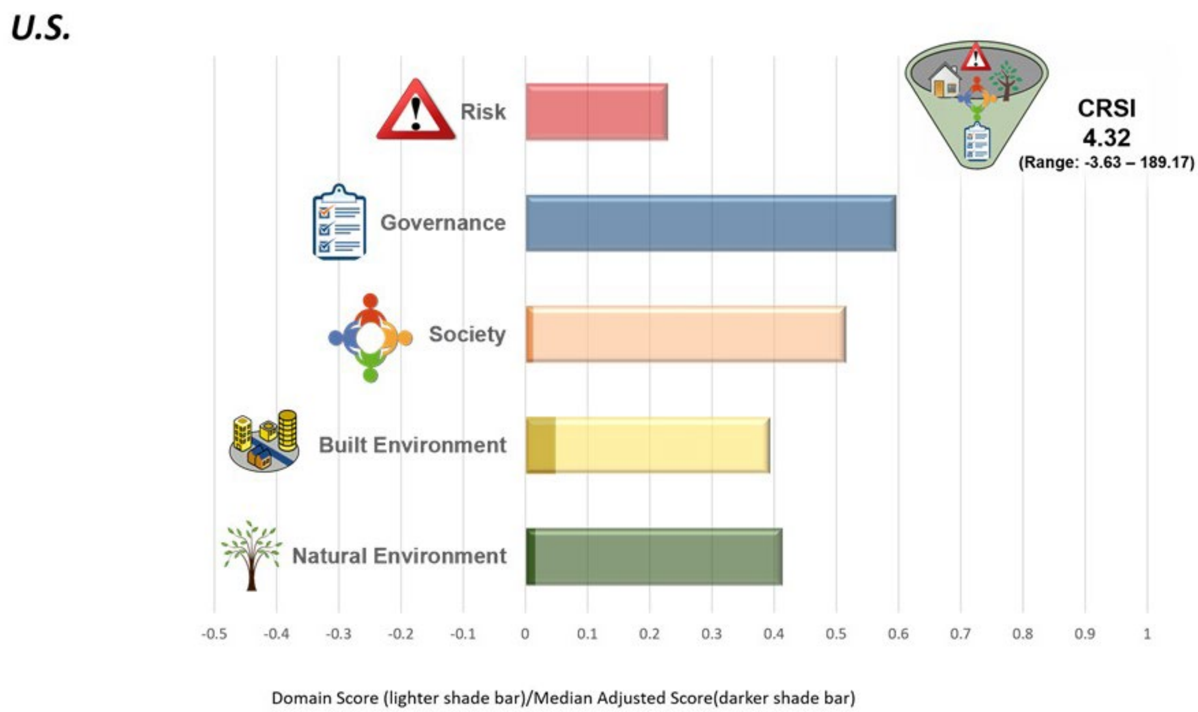


Figure 4.11 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for the U.S, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

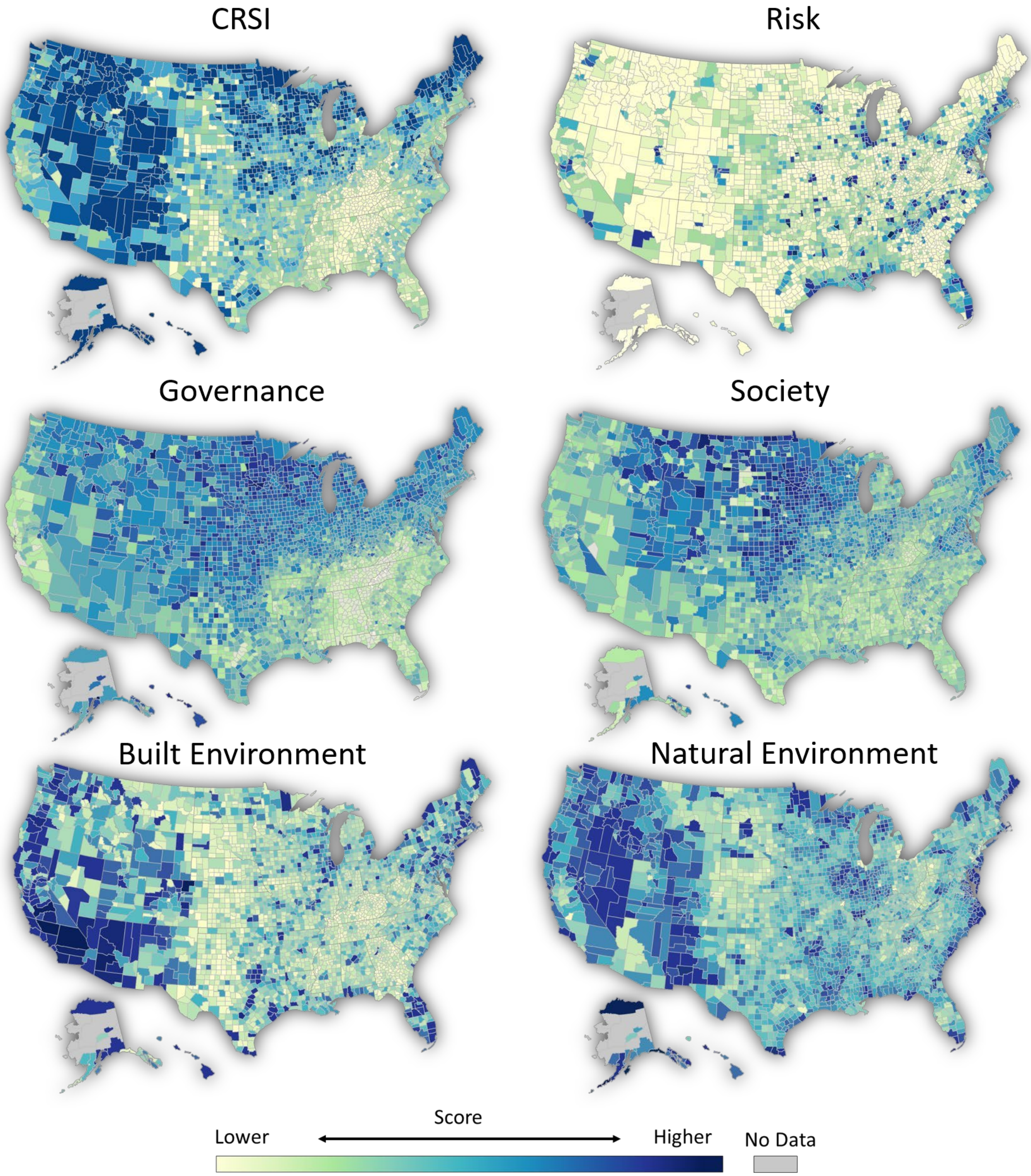


Figure 4.12 The distributions of CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

In order to provide regions and counties with examples of the higher CRSI-scored counties in the U.S., Table 4.1 shows the 150 counties in the U.S. with the highest CRSI values. Region 10 has the most counties in the top 150 list (43 counties) followed by Region 8 (36), Region 5 (34) and Region 1 (15). All of the remaining EPA regions (except Regions 2, 3 and 4) have four or more counties in the top 150. Regions 2 and 3 are represented by a single county in the top 150 counties while Region 4 has no representation in these counties. This provides most EPA regions with several example counties to use as role models for counties characterized by lower CSRI scores. Counties with the lowest scores (25 counties) are predominated by Region 4 (16 counties primarily in Georgia) followed by Region 8 (5) and one each in Regions 6, 7 and 10. Risk due to natural hazard events across the U.S. is examined in more detail in Figure 4.13.

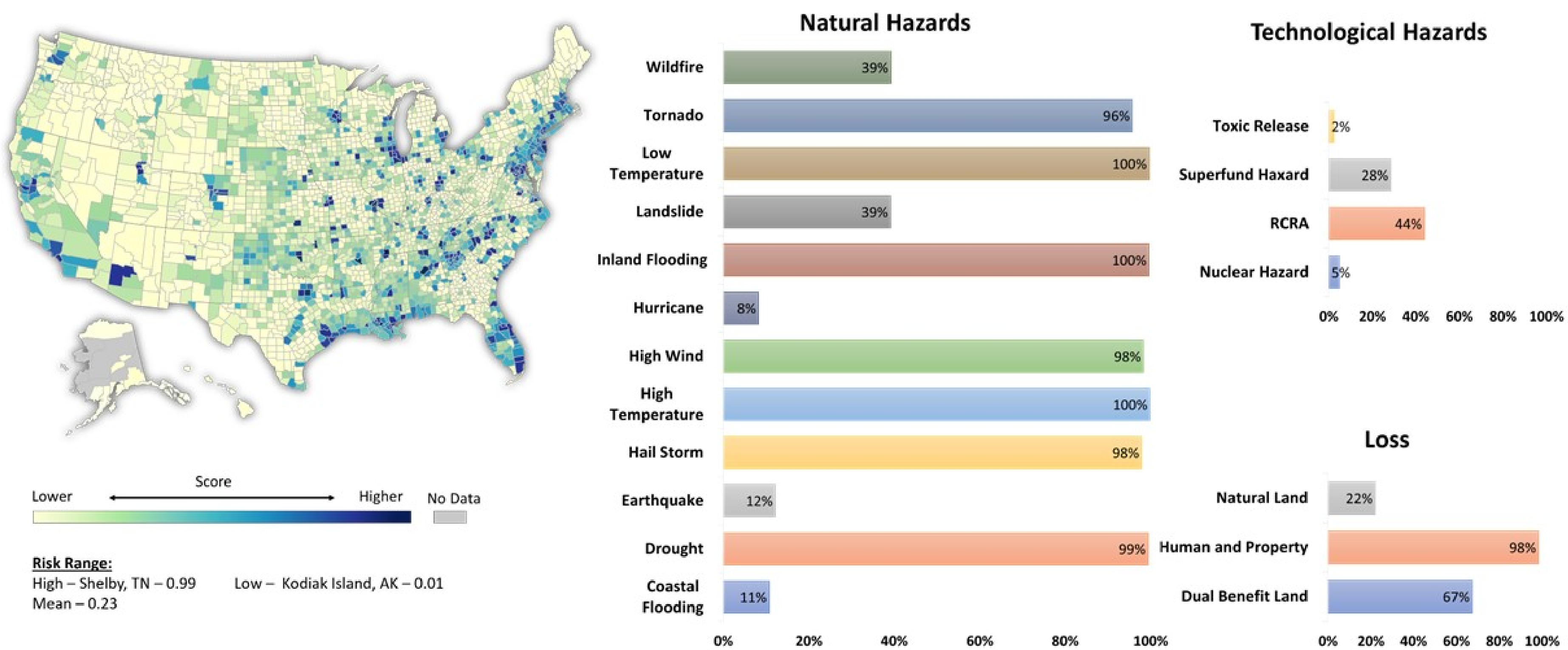
Natural exposures due to natural hazard events are predominated by extreme high temperatures (100% of counties experience) and extreme low temperatures (100%); inland flooding (100%); drought (99%). All other types of exposure due to natural hazard events are represented at 8-98% of counties. RCRA (Resource Conservation and Recovery Act) and Superfund sites dominated the technological exposure indicator at 44% and 28%, respectively. Technological exposure adds potential risk to counties prone to natural hazard event exposures. Nationally, losses are seen primarily on dual benefit and natural land use types (e.g., forests, wetlands, agriculture). Most exposure comes from natural hazard events although 6% of exposure is due to exacerbated exposure resulting from proximity to technological features that pose hazards. Risk ranges from the lowest score of 0.01 in the Kodiak Island and Ketchikan boroughs of Alaska to 0.99 in Shelby County, Tennessee.

The contributions of the 20 indicators to the national domain scores are shown in Figure 4.14. Natural resource conservation (Governance), number of vacant structures and housing characteristics (Built Environment) as well as demographic characteristics (Society) most strongly influenced national domain scores. Secondary influences included levels of loss (Risk), socio-economic characteristics, social cohesion and economic diversity in the Society Domain, community and personal preparedness (Governance) and acreage of ecosystem types (Natural Environment).

Overall, CRSI values, domain scores and indicator contributions all paint a picture for the U.S. of reasonable resilience to natural hazard events. However, the distribution of these scores is broad. While there are many relatively resilient counties in the U.S., there are a number of counties in which overall resilience to natural hazard events is low or one or more of the domain scores are low. Therefore, more specific results and analyses should be examined for each of the regions.

Table 4.1 Top 150 counties according to CRSI values (i.e., potentially higher resilience to natural hazard events).

Rank	County	EPA Region	Rank	County	EPA Region	Rank	County	EPA Region
1.	Kodiak Island, Alaska	Region 10	51.	Somerset, Maine	Region 1	101.	Umatilla, Oregon	Region 10
2.	Juneau City and, Alaska	Region 10	52.	Newton, Indiana	Region 5	102.	Morrison, Minnesota	Region 5
3.	Ketchikan Gateway, Alaska	Region 10	53.	Grant, South Dakota	Region 8	103.	Elmore, Idaho	Region 10
4.	Aleutians East, Alaska	Region 10	54.	Sawyer, Wisconsin	Region 5	104.	Hamlin, South Dakota	Region 8
5.	Hoonah-Angoon, Alaska	Region 10	55.	Pembina, North Dakota	Region 8	105.	Wabaunsee, Kansas	Region 7
6.	Haines, Alaska	Region 10	56.	Pitkin, Colorado	Region 8	106.	Essex, Vermont	Region 1
7.	Prince of Wales-Hyder, Alas	Region 10	57.	Gunnison, Colorado	Region 8	107.	Sanders, Montana	Region 8
8.	North Slope, Alaska	Region 10	58.	Washington, Maine	Region 1	108.	Marshall, Kansas	Region 7
9.	Sitka City and, Alaska	Region 10	59.	San Miguel, Colorado	Region 8	109.	Moody, South Dakota	Region 8
10.	Dillingham, Alaska	Region 10	60.	Kalkaska, Michigan	Region 5	110.	Sweetwater, Wyoming	Region 8
11.	Petersburg, Alaska	Region 10	61.	Oneida, Wisconsin	Region 5	111.	Eagle, Colorado	Region 8
12.	Hancock, Maine	Region 1	62.	Aroostook, Maine	Region 1	112.	Sanilac, Michigan	Region 5
13.	Bristol Bay, Alaska	Region 10	63.	Duchesne, Utah	Region 8	113.	King William, Virginia	Region 3
14.	Kenai Peninsula, Alaska	Region 10	64.	Chickasaw, Iowa	Region 7	114.	Routt, Colorado	Region 8
15.	Wrangell City and, Alaska	Region 10	65.	Oceana, Michigan	Region 5	115.	Pulaski, Indiana	Region 5
16.	Fairbanks North Star, Alask	Region 10	66.	Vilas, Wisconsin	Region 5	116.	Codington, South Dakota	Region 8
17.	Skagway Municipality, Alask	Region 10	67.	Pipestone, Minnesota	Region 5	117.	Uintah, Utah	Region 8
18.	Waldo, Maine	Region 1	68.	Koochiching, Minnesota	Region 5	118.	Grant, Minnesota	Region 5
19.	Aleutians West, Alaska	Region 10	69.	Price, Wisconsin	Region 5	119.	San Juan, New Mexico	Region 6
20.	Maui, Hawaii	Region 9	70.	Washburn, Wisconsin	Region 5	120.	Ashland, Wisconsin	Region 5
21.	Yakutat City and, Alaska	Region 10	71.	Penobscot, Maine	Region 1	121.	Missaukee, Michigan	Region 5
22.	Anchorage Municipality, Ala	Region 10	72.	Deschutes, Oregon	Region 10	122.	Baker, Oregon	Region 10
23.	Dukes, Massachusetts	Region 1	73.	Fillmore, Minnesota	Region 5	123.	Polk, Wisconsin	Region 5
24.	Latah, Idaho	Region 10	74.	Shawano, Wisconsin	Region 5	124.	Newaygo, Michigan	Region 5
25.	Roberts, South Dakota	Region 8	75.	Coconino, Arizona	Region 9	125.	Wilkin, Minnesota	Region 5
26.	Lake and Peninsula, Alaska	Region 10	76.	Forest, Wisconsin	Region 5	126.	Mineral, Montana	Region 8
27.	Bonner, Idaho	Region 10	77.	Lincoln, Maine	Region 1	127.	Cass, Minnesota	Region 5
28.	Kauai, Hawaii	Region 9	78.	Benton, Indiana	Region 5	128.	Luna, New Mexico	Region 6
29.	Lincoln, Minnesota	Region 5	79.	Asotin, Washington	Region 10	129.	Summit, Colorado	Region 8
30.	Pierce, Nebraska	Region 7	80.	Ward, North Dakota	Region 8	130.	Taylor, Wisconsin	Region 5
31.	Hawaii, Hawaii	Region 9	81.	Malheur, Oregon	Region 10	131.	Rutland, Vermont	Region 1
32.	Valley, Idaho	Region 10	82.	Pend Oreille, Washington	Region 10	132.	Cassia, Idaho	Region 10
33.	Boundary, Idaho	Region 10	83.	Beaverhead, Montana	Region 8	133.	Jasper, Indiana	Region 5
34.	Flathead, Montana	Region 8	84.	Huron, Michigan	Region 5	134.	Richardson, Nebraska	Region 7
35.	Addison, Vermont	Region 1	85.	Garfield, Colorado	Region 8	135.	Clayton, Iowa	Region 7
36.	Day, South Dakota	Region 8	86.	Wasco, Oregon	Region 10	136.	Sierra, New Mexico	Region 6
37.	Daniels, Montana	Region 8	87.	Teton, Montana	Region 8	137.	Grafton, New Hampshire	Region 1
38.	Carbon, Wyoming	Region 8	88.	Idaho, Idaho	Region 10	138.	Marshall, Minnesota	Region 5
39.	Hamilton, New York	Region 2	89.	Mono, California	Region 9	139.	Knox, Maine	Region 1
40.	Benewah, Idaho	Region 10	90.	Adams, Idaho	Region 10	140.	Jackson, Wisconsin	Region 5
41.	Uinta, Wyoming	Region 8	91.	Grand Isle, Vermont	Region 1	141.	Grant, Oregon	Region 10
42.	Itasca, Minnesota	Region 5	92.	Granite, Montana	Region 8	142.	Winneshiek, Iowa	Region 7
43.	Florence, Wisconsin	Region 5	93.	Chaffee, Colorado	Region 8	143.	Toole, Montana	Region 8
44.	Blaine, Idaho	Region 10	94.	McLean, North Dakota	Region 8	144.	Ottawa, Kansas	Region 7
45.	San Juan, Washington	Region 10	95.	Jefferson, Montana	Region 8	145.	Door, Wisconsin	Region 5
46.	Deuel, South Dakota	Region 8	96.	Whitman, Washington	Region 10	146.	Navajo, Arizona	Region 9
47.	Lincoln, Montana	Region 8	97.	Coos, New Hampshire	Region 1	147.	Fayette, Iowa	Region 7
48.	Ouray, Colorado	Region 8	98.	McKinley, New Mexico	Region 6	148.	Millard, Utah	Region 8
49.	Honolulu, Hawaii	Region 9	99.	Union, Oregon	Region 10	149.	Valdez-Cordova, Alaska	Region 10
50.	Ravalli, Montana	Region 8	100.	Nez Perce, Idaho	Region 10	150.	Iron, Wisconsin	Region 5



. Figure 4.4 U.S. map depicting scored natural hazard risk exposure by county. Bar charts showing the percentage of counties with ≥ 0.01% of total land area: exposed to natural hazards by event type; at risk for secondary technological hazard exposures; and cumulative losses incurred as a result of natural hazard events. The counties exhibiting the highest risk and lowest risk along with National risk score average (several counties have 0.01 and 0.99 adjusted risk domain scores but Kodiak Island, AK has the lowest unadjusted calculated risk score and Shelby, TN has the highest unadjusted risk score).

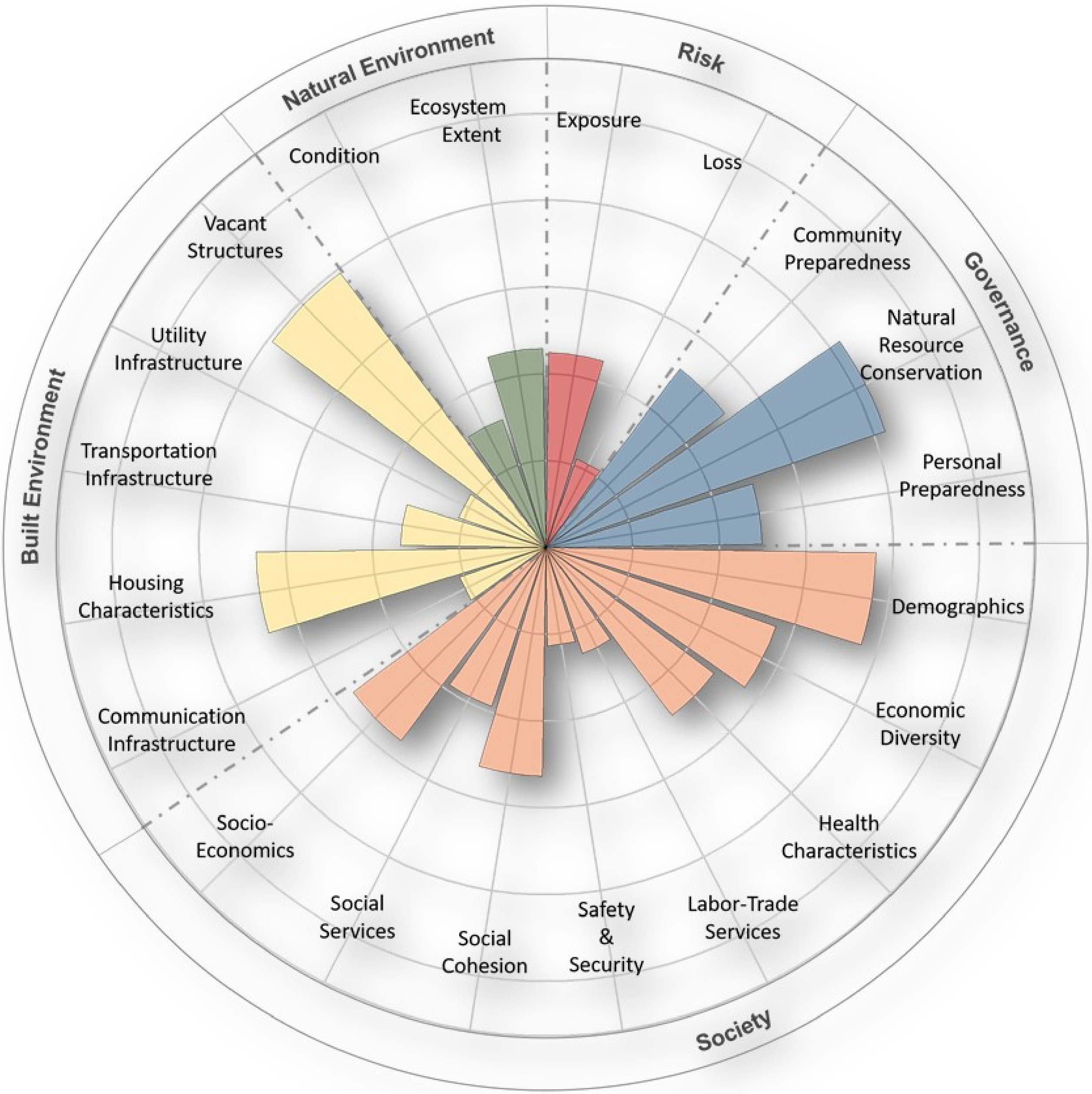


Figure 4.5 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the nation. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain.

4.3.7 Regional Results

The following sections depict the results for all ten EPA Regions.

EPA Region 1

EPA Region 1 serves Connecticut, New Hampshire, Maine, Massachusetts, Rhode Island, and Vermont. Region 1 also serves ten federally recognized tribes within Maine, Massachusetts, Connecticut and Rhode Island. Areas within Region 1 are prone to, and often impacted by, intense rainfall, sea level rise, and heatwaves. For example, Cambridge, MA has experienced extreme rain events leading to flooding and compromising infrastructure. Nearby, Boston, MA, is projected to experience the same types of extreme rain events, but given its proximity to the coast, flooding will be exacerbated by sea level rise and erosion impacts are more of a concern. Since Boston is more urban, these issues have to be dealt with in the context of affordable housing and social inequity. The 2014 EPA Region 1 Climate Change Adaptation Plan (USEPA-R1 2014) suggests re-nourishing coasts with dredged material, performing marsh restoration and considering "living shorelines" to combat coastal wetland erosion. Suggested actions around severe rainfall and sea level rise focused on determining where the impacts would occur and focusing current restoration or infrastructure improvement efforts based on that information. For example, prioritizing restoration of tidal wetlands that have room to migrate with sea level rise.
The CRSI and domain scores for EPA Region 1 are shown in Figure 4.15. The Region is characterized by moderate risk, moderate to high Governance, moderate to high Society, Built Environment and Natural Environment scores. The domain scores for Society, Built Environment and Natural Environment showed positive influences (all higher the national averages for positive influence) on the overall CRSI score of 4.375. The Region 1 CRSI score ranked 2nd among the ten EPA Regions.

The overall CRSI score and 5 domain scores for EPA Region 1 are depicted in Figure 4.16. The higher CRSI values are seen in the northern counties of Maine, a number of counties in Vermont and select counties in New Hampshire (Table 4.2). Lower CSRI scores (< 2.0) for the region are seen in Connecticut (3 counties), Rhode Island (3), middle Massachusetts (2), and New Hampshire (1). The highest risk domain scores are seen in middle Massachusetts, and most of Connecticut.

Risk due to natural hazard events across Region 1 is examined in more detail in Figure 4.17. Natural exposures due to natural hazard events are dominated by high and low temperatures, wind, drought, hail and inland flooding (99-100% of counties). Tornadoes and landslides also represent a sizeable portion of the risk potential (87% and 57% of counties, respectively). All other types of exposure due to natural hazard events are represented at 0-48% of counties. RCRA (Resource Conservation and Recovery Act) sites and Superfund sites represent a majority of the technological exposure indicator at 78% and 67% of counties, respectively. Nuclear sites contribute only 18% of the exposure potential. In the region, losses are represented almost exclusively (96%) in natural lands, with the other 4% of regional losses coming from dual-benefit lands. Risk ranges from a low score of 0.03 in Waldo County, Maine to a high score of 0.65 in Hartford County, Connecticut. The mean regional risk (0.24) falls at about the national average at 0.23.

The contributions of the 20 indicators to EPA Region 1 domain scores are shown in Figure 4.18. Higher scores for indicators of natural resource conservation, demographic characteristics and number of vacant structures contributed to higher scores in each respective domain. These influences combined with low loss contribution from the risk domain are reflected in the Region's higher CRSI value of 4.375. Safety and security, labor-trade services and ecosystem condition had minimal influence on the EPA Region 1 domain scores.

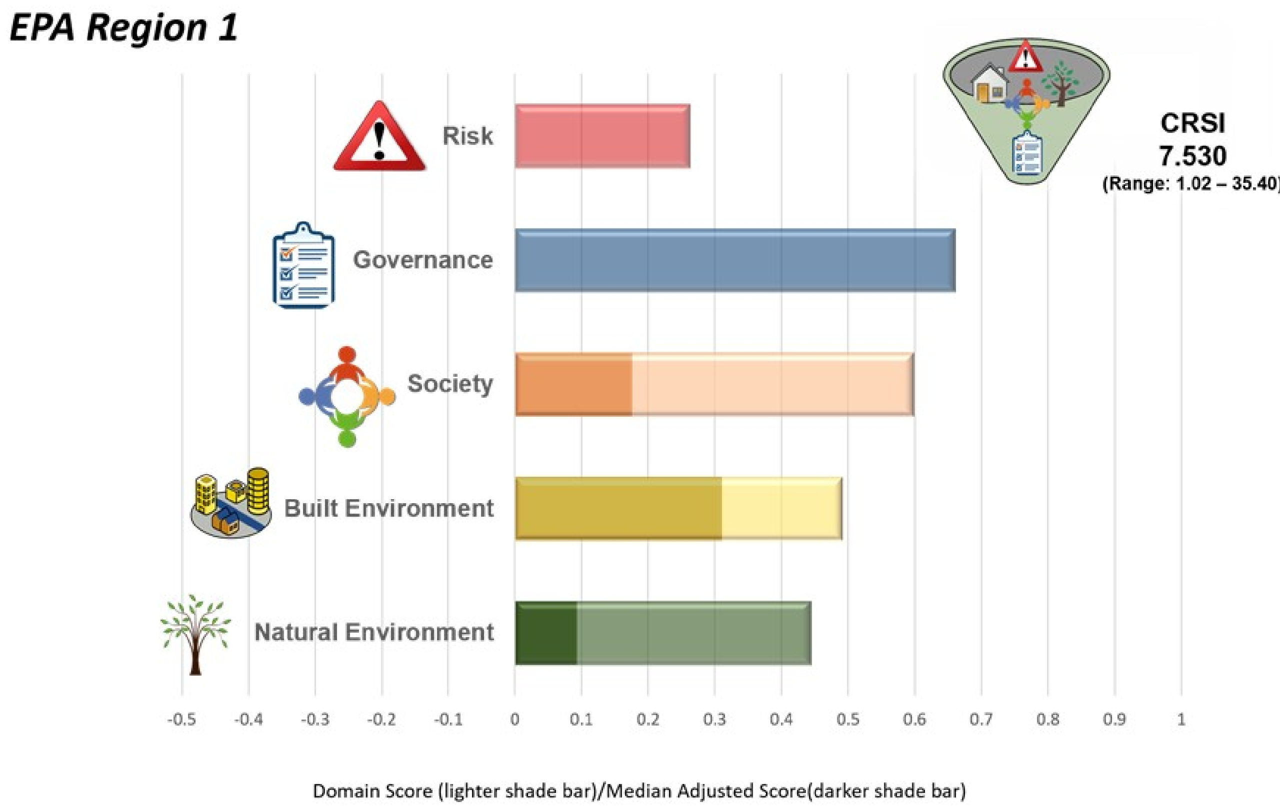


Figure 4.6 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 1 along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

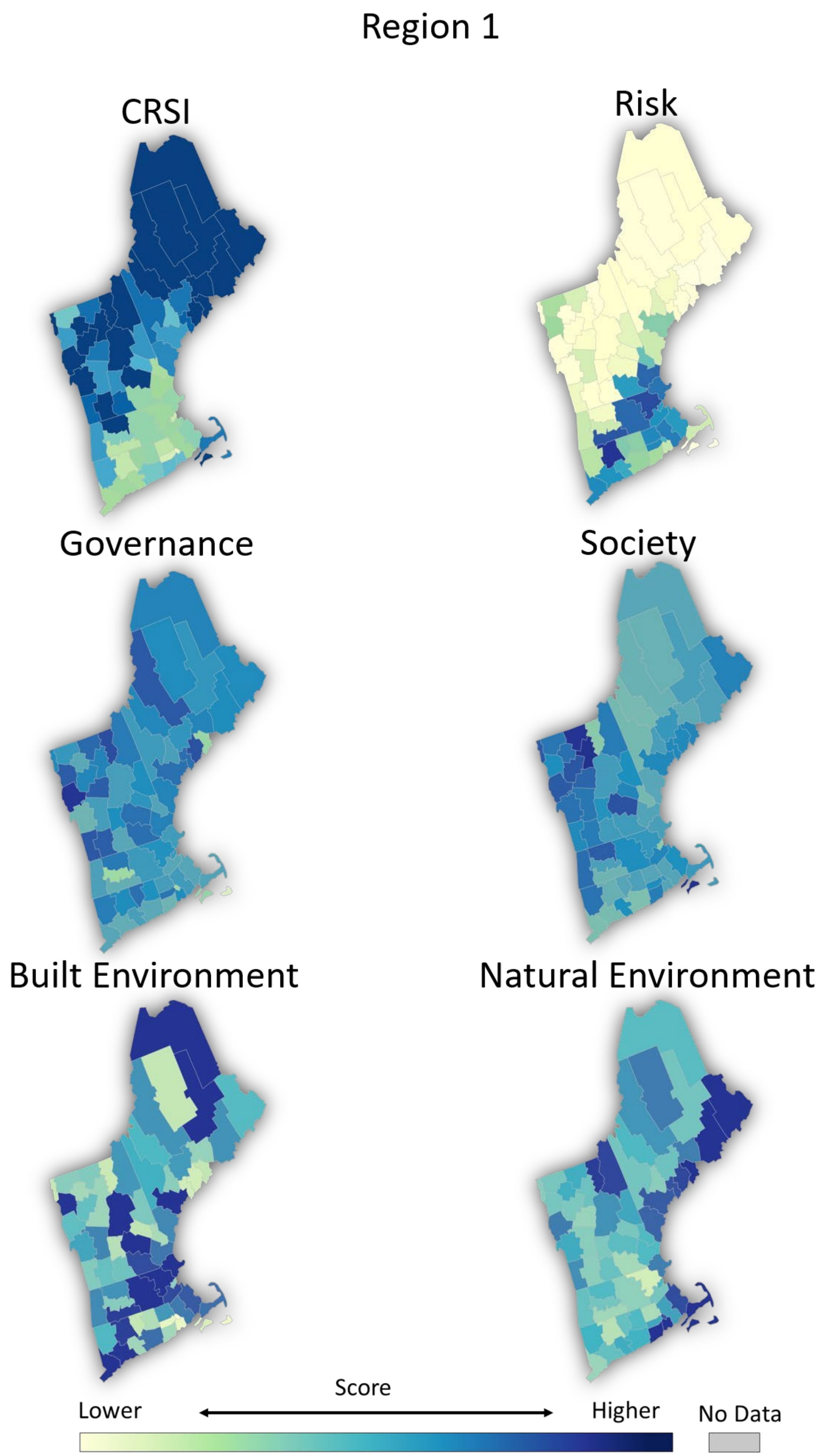


Figure 4.16 The distributions of EPA Region 1 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.2 Top 25 counties according to CRSI values in EPA Region 1 (i.e., higher resilience to natural hazard events).

Region1	
Rank	**County**
1.	Hancock, Maine
2.	Waldo, Maine
3.	Dukes, Massachusetts
4.	Addison, Vermont
5.	Somerset, Maine
6.	Washington, Maine
7.	Aroostook, Maine
8.	Penobscot, Maine
9.	Lincoln, Maine
10.	Grand Isle, Vermont
11.	Coos, New Hampshire
12.	Essex, Vermont
13.	Rutland, Vermont
14.	Grafton, New Hampshire
15.	Knox, Maine
16.	Lamoille, Vermont
17.	Merrimack, New Hampshire
18.	Piscataquis, Maine
19.	Windham, Vermont
20.	Washington, Vermont
21.	Caledonia, Vermont
22.	Franklin, Maine
23.	Franklin, Massachusetts
24.	Cheshire, New Hampshire
25.	Sagadahoc, Maine

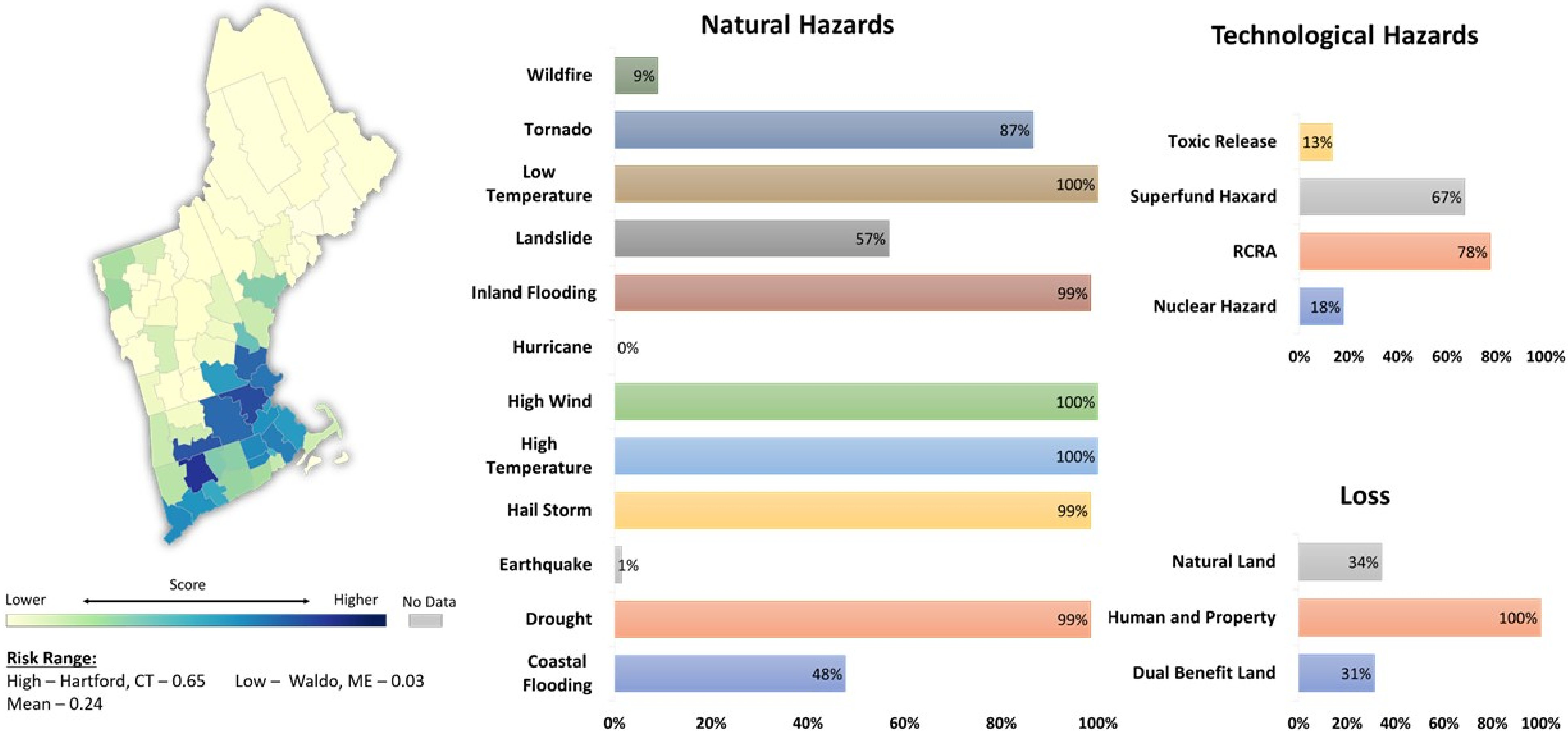


Figure 4.7 Map of Risk Domain scores by county for Region 1; proportion of natural exposures by climate event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region (If a category was represented by <0.1%, it was not included).

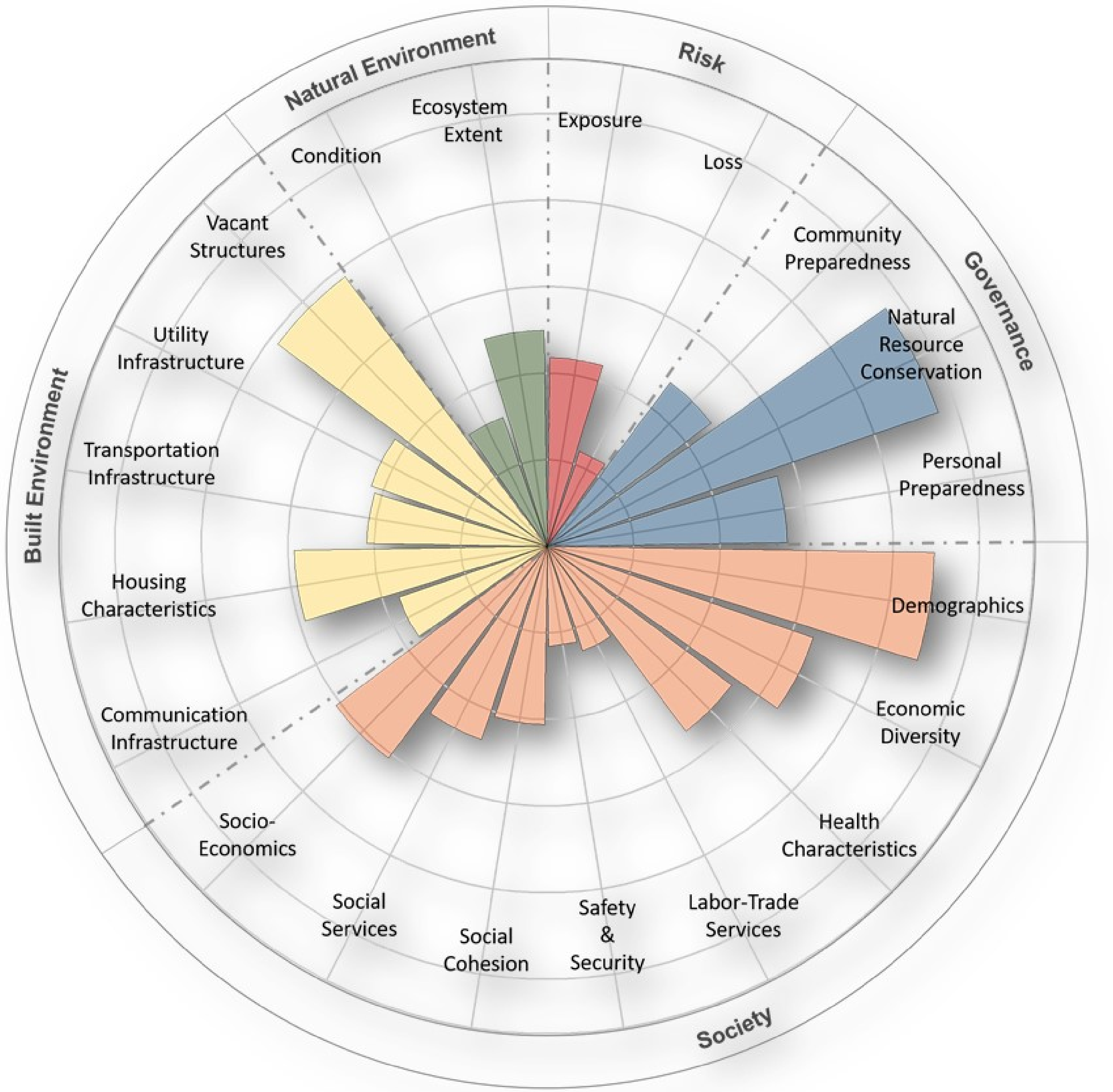


Figure 4.8 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 1. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

<u>EPA Region 2</u>

Region 2 of the EPA serves New Jersey, New York, and the territories of Puerto Rico and the U.S. Virgin Islands. Region 2 also serves eight federally recognized Indian Nations, all within New York. Region 2 shares the same regional impacts as Region 1; intense rainfall, sea level rise, and heatwaves. Cities such as New York, NY have experienced multiple impacts, including extreme heatwaves, sea level rise, severe storms and erosion. The age and scale of New York's transportation infrastructure combined with the dense population raises some unique resilience concerns. The EPA Region 2 Climate Change Adaptation Plan of 2014 (USEPA-R2 2014) suggests managing increased storm water using green infrastructure and building more resistance to climate change impacts through investments in infrastructure.

The CRSI and domain scores for EPA Region 2 are shown in Figure 4.19. The Region is characterized by above average risk; high Governance; moderate Society; high Built Environment; and, lower Natural Environment scores. The domain scores for Society and Built Environment showed positive influences (particularly Built Environment) on the overall CRSI score of 3.839 while the Natural Environment score had a negative influence on the CRSI score. Region 2 CRSI score ranked below average in terms of overall resilience to natural hazard events among all EPA Regions. The higher resilience to natural hazard events risk scores in EPA Region 2 were seen in upper New York while the lower risk counties were in upper and western New York (Figure 4.20 and Table 4.3). The lower resilience scores were observed in both New York and New Jersey with 10-13 counties in each state with low CRSI values (< 2.0). The higher risk of natural hazard events counties (Risk > 0.59) are seen primarily in New Jersey (Ocean, Monmouth) and Westchester, New York.

Risk due to natural hazard events across Region 2 is examined in more detail in Figure 4.21. Natural exposures due to natural hazard events are dominated by extreme high and low temperatures, high wind, hail and tornadoes (100% of counties). Inland flooding and drought risks occurred in 99% and 90% of counties in Region 2, respectively. All other types of exposure due to natural hazard events are represented at 2-41% of counties. RCRA and Superfund sites represent a majority of technological exposure indicator at 99% and 83% of counties, respectively. Nuclear hazards and TRI (Toxic Release Inventory) sites contribute only 13-14% of the exposure potential. Natural hazard risk potential dominates the region, with only 21% of the risk attributable to technological exposure potential. Risk ranges from a low score of 0.06 in Hamilton County, New York to a high score of 0.81 in Ocean County, New Jersey. The mean regional risk (0.31) falls significantly above the national average at 0.23.

The contributions of the twenty CRSI indicators are shown in Figure 4.22. Strong positive influences on the Region 2 domain scores come from community preparedness and natural resource conservation (Governance), demographic characteristics (Society) and vacant structures (Built Environment). In the Society Domain, secondary positive influences are seen from economic diversity, socio-economic characteristics and higher social cohesion scores. Weak influences (and sometimes strong negative influences) on the Region 2 score come from safety and security and labor-trade services (Society) as well as greater exposure risk.

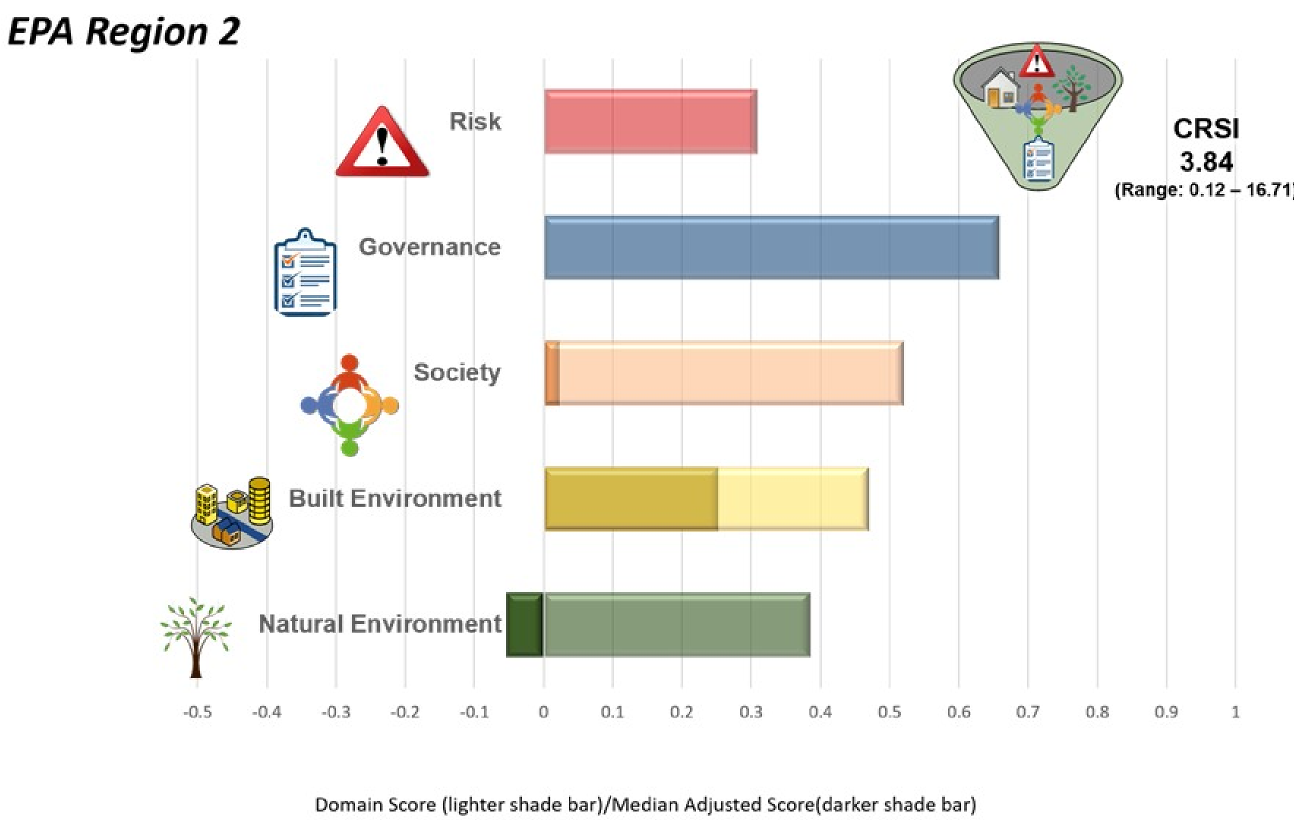


Figure 4.9 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 2, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

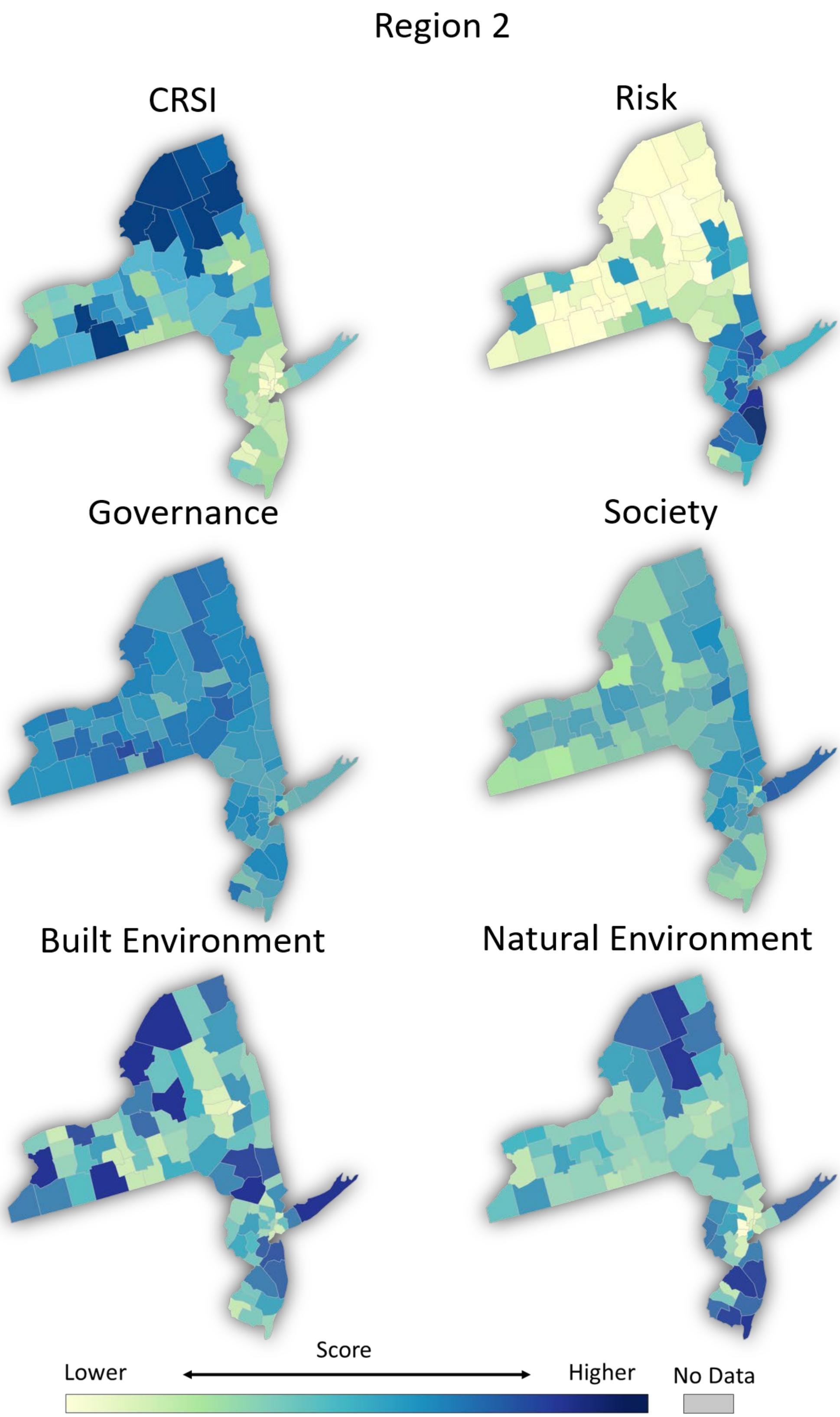


Figure 4.20 The distributions of EPA Region 2 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.3 Highest 25 CRSI values in EPA Region 2 by county.

Region 2	
Rank	**County**
1.	Hamilton, New York
2.	Steuben, New York
3.	St. Lawrence, New York
4.	Lewis, New York
5.	Essex, New York
6.	Livingston, New York
7.	Jefferson, New York
8.	Franklin, New York
9.	Herkimer, New York
10.	Clinton, New York
11.	Schuyler, New York
12.	Warren, New York
13.	Schoharie, New York
14.	Ontario, New York
15.	Tompkins, New York
16.	Cayuga, New York
17.	Yates, New York
18.	Chautauqua, New York
19.	Wyoming, New York
20.	Ulster, New York
21.	Columbia, New York
22.	Cattaraugus, New York
23.	Oneida, New York
24.	Allegany, New York
25.	Otsego, New York

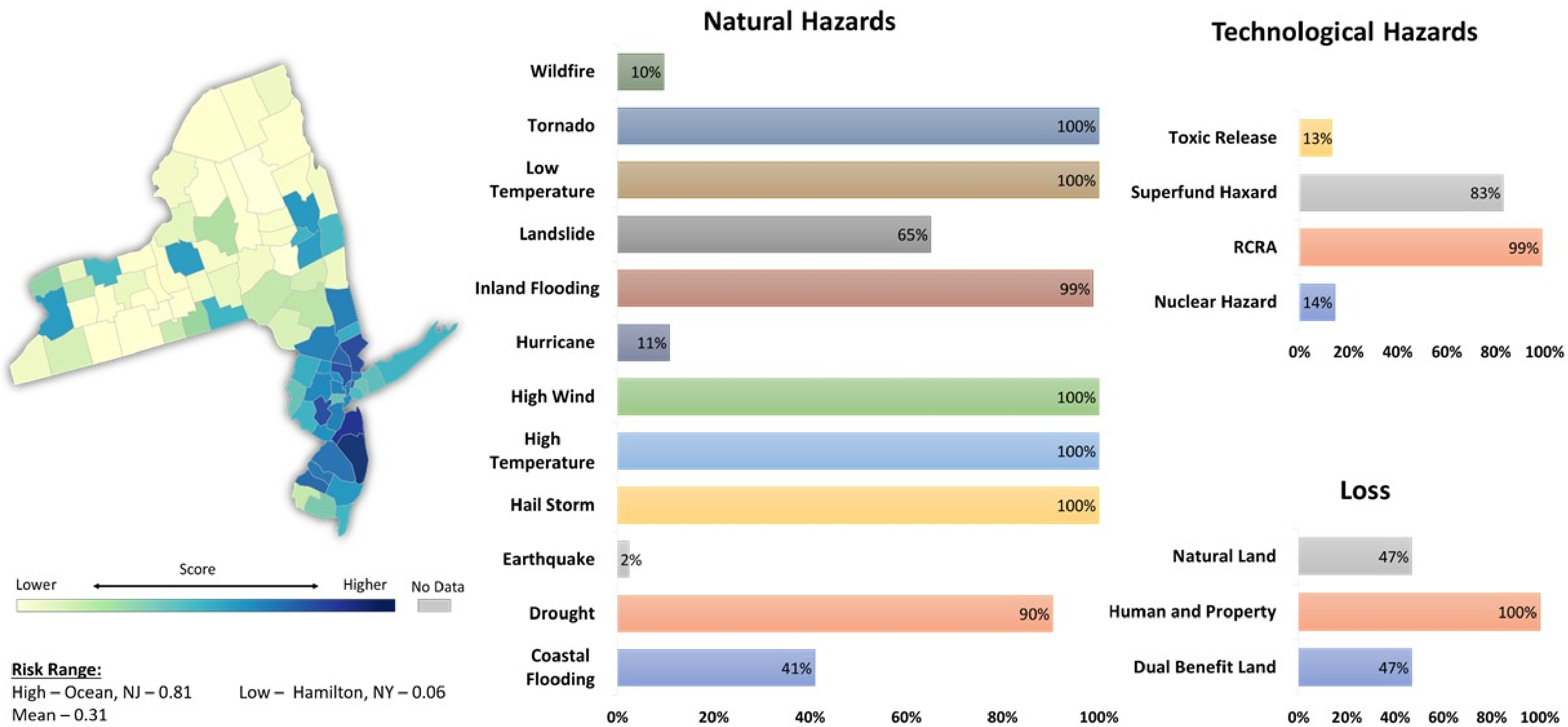


Figure 4.10 Map of Risk Domain scores by county for Region 2; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

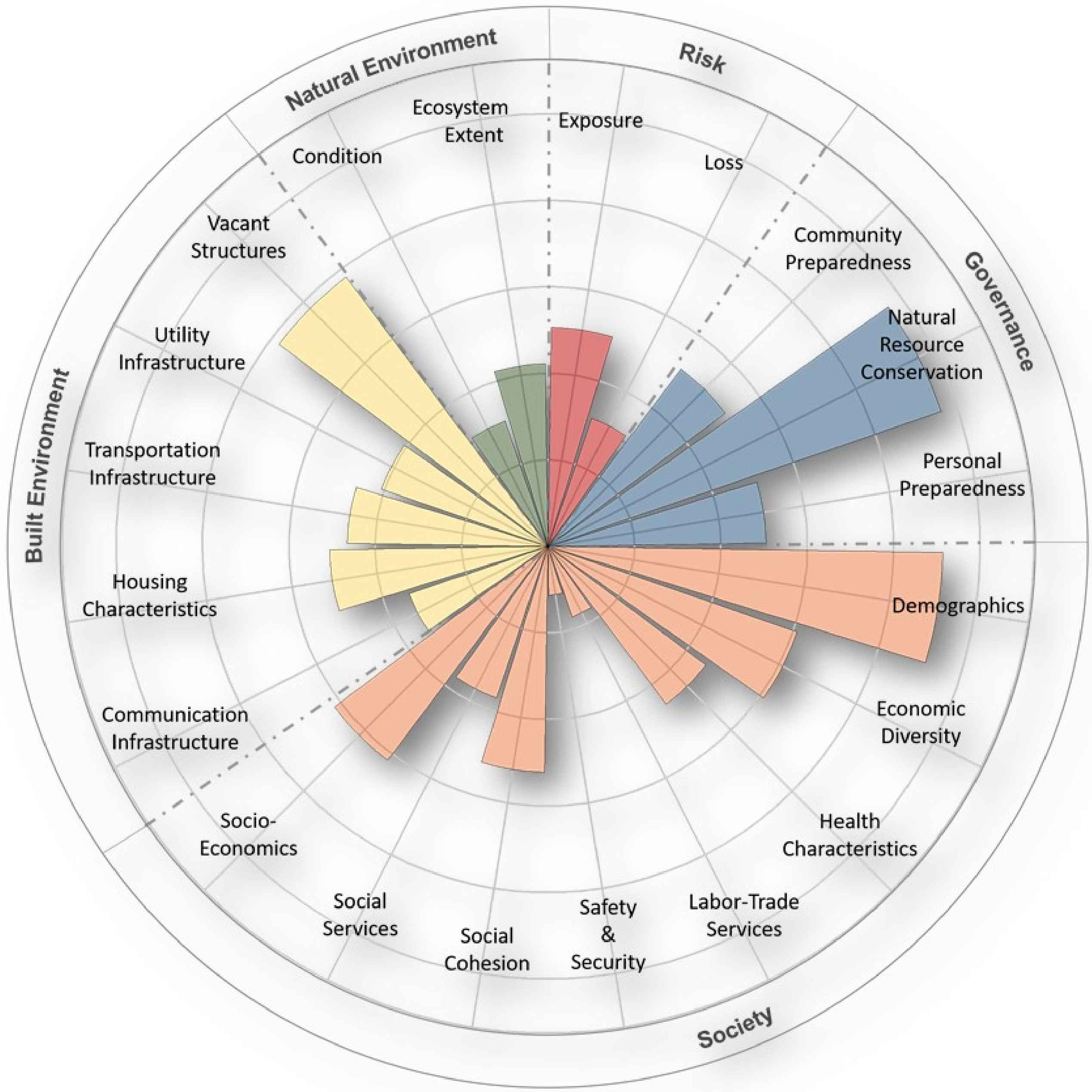


Figure 4.11 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 2. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

EPA Region 3

Region 3 of the EPA serves the states of Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. There is one federally recognized tribe in this region. The majority of the Region is impacted by heatwaves, intense rainfall, and sea level rise. Washington, D.C. has been impacted by extreme heat and rainfall events, the latter leading to flooding and infrastructure damage. The cities' infrastructure is also a resiliency concern when it comes to evacuating during an emergency because bottlenecks could be an issue. With the exception of extreme heat events, Norfolk, VA, has been burdened by the same concerns and damages as Washington D.C. Norfolk, a coastal city, is already dealing with the impacts of erosion and sea level rise. Lewes, DE is another coastal city being impacted by sea level rise and erosion. Pittsburgh, PA is forecasted to experience extreme rainfall, flooding and erosion from storms, but also faces concerns about environmental degradation, infrastructure damage, and eventual infrastructure failure. The EPA Region 3 Climate Change Adaptation Plan of May 2014 (USEPA-R3 2014) focuses on increasing tools and training materials available to help counties and communities choose between the different adaptation strategies available to them.

A summary of the CRSI and domain scores is displayed in Figure 4.23. The CRSI score for Region 3 (2.934) is significantly below the national average and ranked 9th among the ten EPA Regions. The regional Governance score is moderate, and the risk domain score is above average. The Society domain score is average and has little influence on the CRSI score while the Built Environment and Natural Environment domain score are below average and negatively affect the regional CRSI score. The counties with higher resilience scores in EPA Region 3 are in upper Pennsylvania, eastern West Virginia, and lower Virginia (Figure 4.24 and Table 4.4). The higher CRSI values in Region 3 occur in Pennsylvania (15 counties), Virginia (8), Maryland (1) and West Virginia (1). The lower CRSI values (< 0.0) were predominantly in Virginia (20) and West Virginia (3). Risk domain scores were highest in northwestern Chesapeake Bay counties, the District of Columbia, southeastern Virginia, northern Delaware, and southeastern Pennsylvania.

Risk due to natural hazard events across Region 3 is examined in more detail in Figure 4.25. Natural exposures due to natural hazard events associated with high and low temperatures, inland flooding, high winds, hail and drought occur in virtually all counties in Region 3. Tornadoes and landslides also represent a sizeable portion of the risk potential (95% and 80% of counties, respectively), while representation of all other types of exposure due to natural hazard events are 0-25% of counties. RCRA (Resource Conservation and Recovery Act) sites and Superfund sites represent a majority of technological exposure indicator at 73% and 41%, respectively. Nuclear sites also contribute 7% of the exposure potential. Natural hazard risk potential dominates the region, with only 12% of the risk attributable to technological exposure potential. Risk ranges from a low score of 0.07 in Tucker County, West Virginia to a high score of 0.71 in Chesapeake City, Virginia. The mean regional risk (0.27) falls above the national average at 0.229.

Contributions of CRSI's twenty indicators to the overall Region 3 domain scores is displayed in Figure 4.26. The highest indicator scores contributing each domain include vacant structures (Built Environment), demographic characteristics (Society) and natural resource conservation and community preparedness (Governance). Secondary contributors include housing characteristics (Built Environment), economic diversity and socio-economic factors (Society) and higher scores for the exposure indicator influenced higher risk to natural hazard events in this Region. Lower contributors to the Region 3 domain scores are communications and utility infrastructure (Built Environment) and safety and security, and labor-trade services (Society).

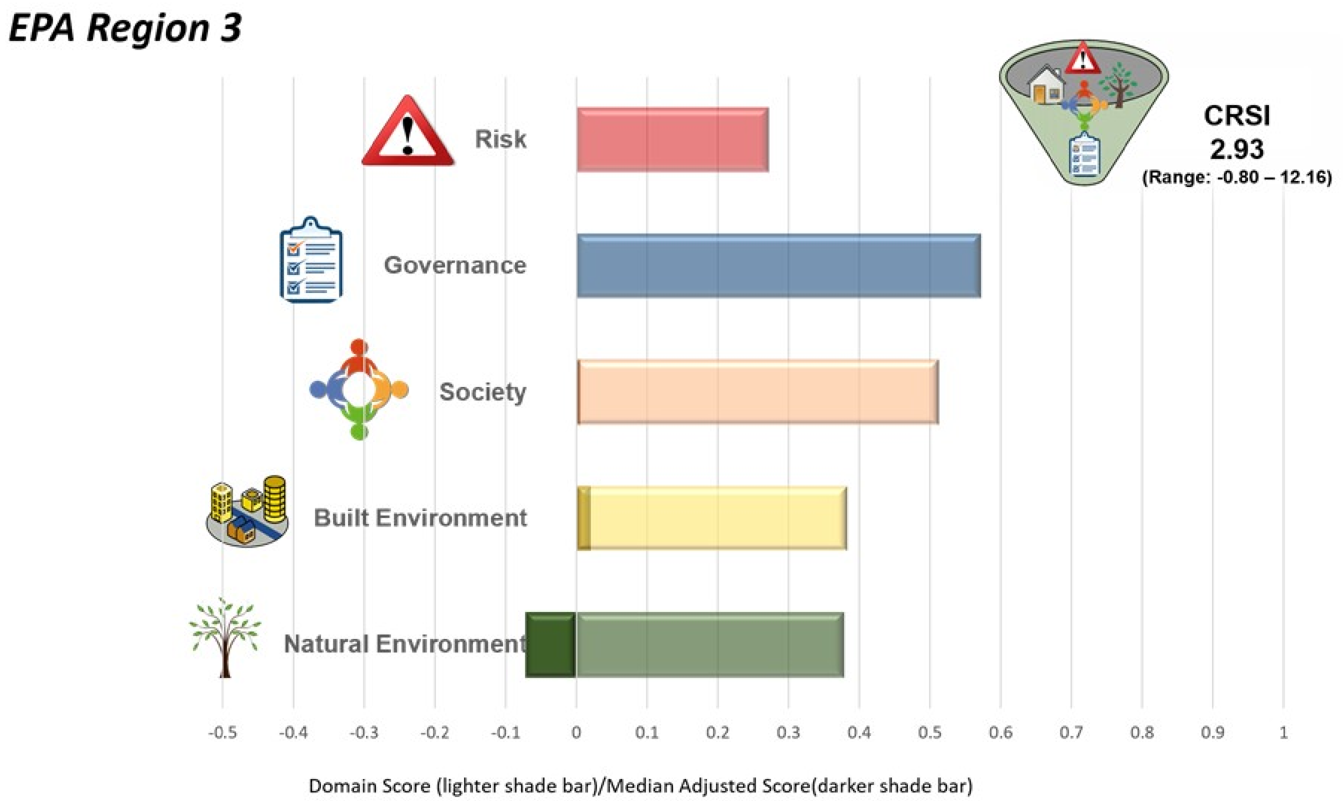


Figure 4.12 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 3, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

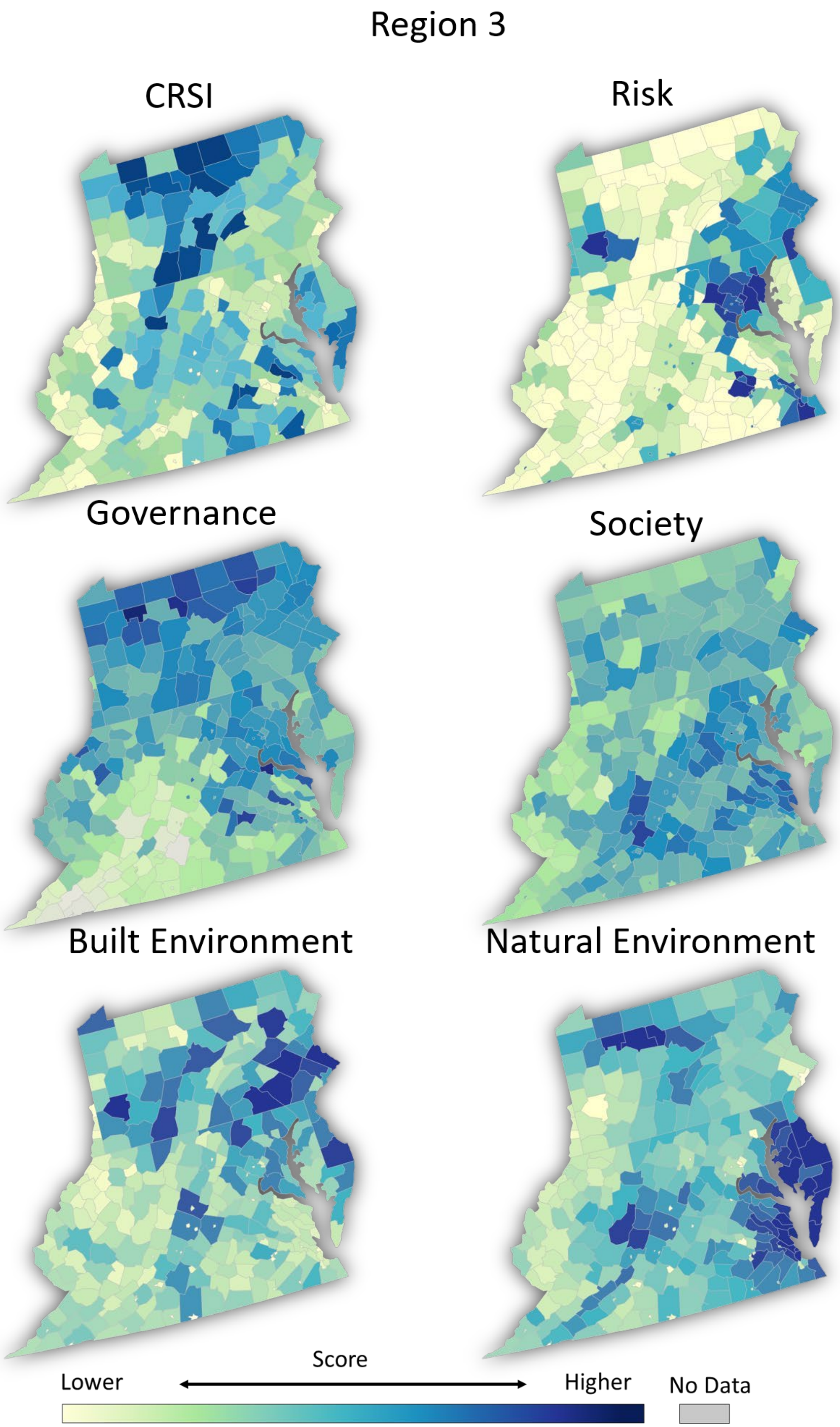


Figure 4.24 The distributions of EPA Region 3 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.4 Counties in EPA Region 3 with the highest CRSI values.

Region 3	
Rank	**County**
1.	King William, Virginia
2.	Tioga, Pennsylvania
3.	Huntingdon, Pennsylvania
4.	Potter, Pennsylvania
5.	Tucker, West Virginia
6.	Warren, Pennsylvania
7.	Somerset, Pennsylvania
8.	Perry, Pennsylvania
9.	Clinton, Pennsylvania
10.	Bedford, Pennsylvania
11.	Powhatan, Virginia
12.	Forest, Pennsylvania
13.	Cumberland, Virginia
14.	Elk, Pennsylvania
15.	Southampton, Virginia
16.	Lycoming, Pennsylvania
17.	Somerset, Maryland
18.	Cameron, Pennsylvania
19.	Clarion, Pennsylvania
20.	King and Queen, Virginia
21.	Accomack, Virginia
22.	Sullivan, Pennsylvania
23.	Bradford, Pennsylvania
24.	Charlotte, Virginia
25.	Charles City, Virginia

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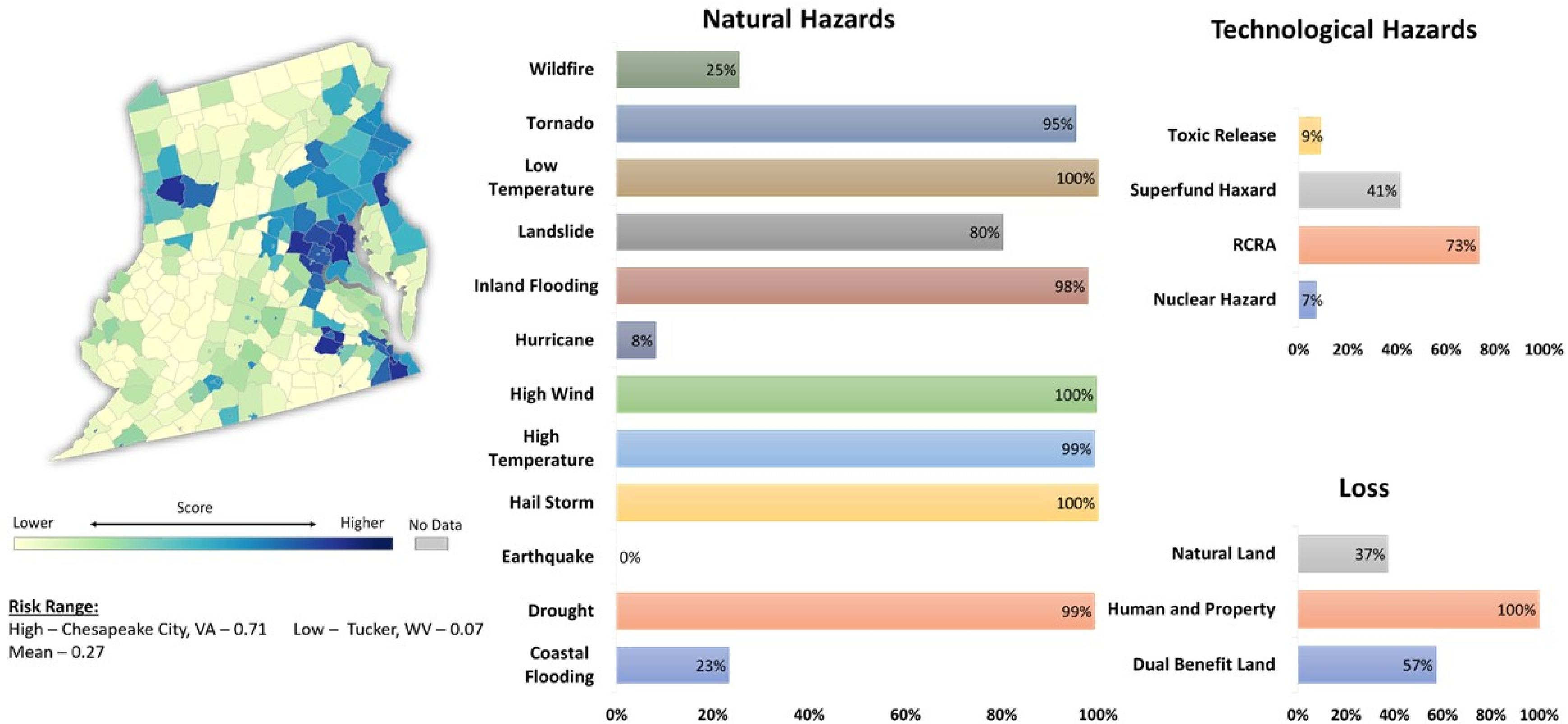


Figure 4.13 Map of Risk Domain scores by county for Region 3; proportion of natural exposures by climate event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

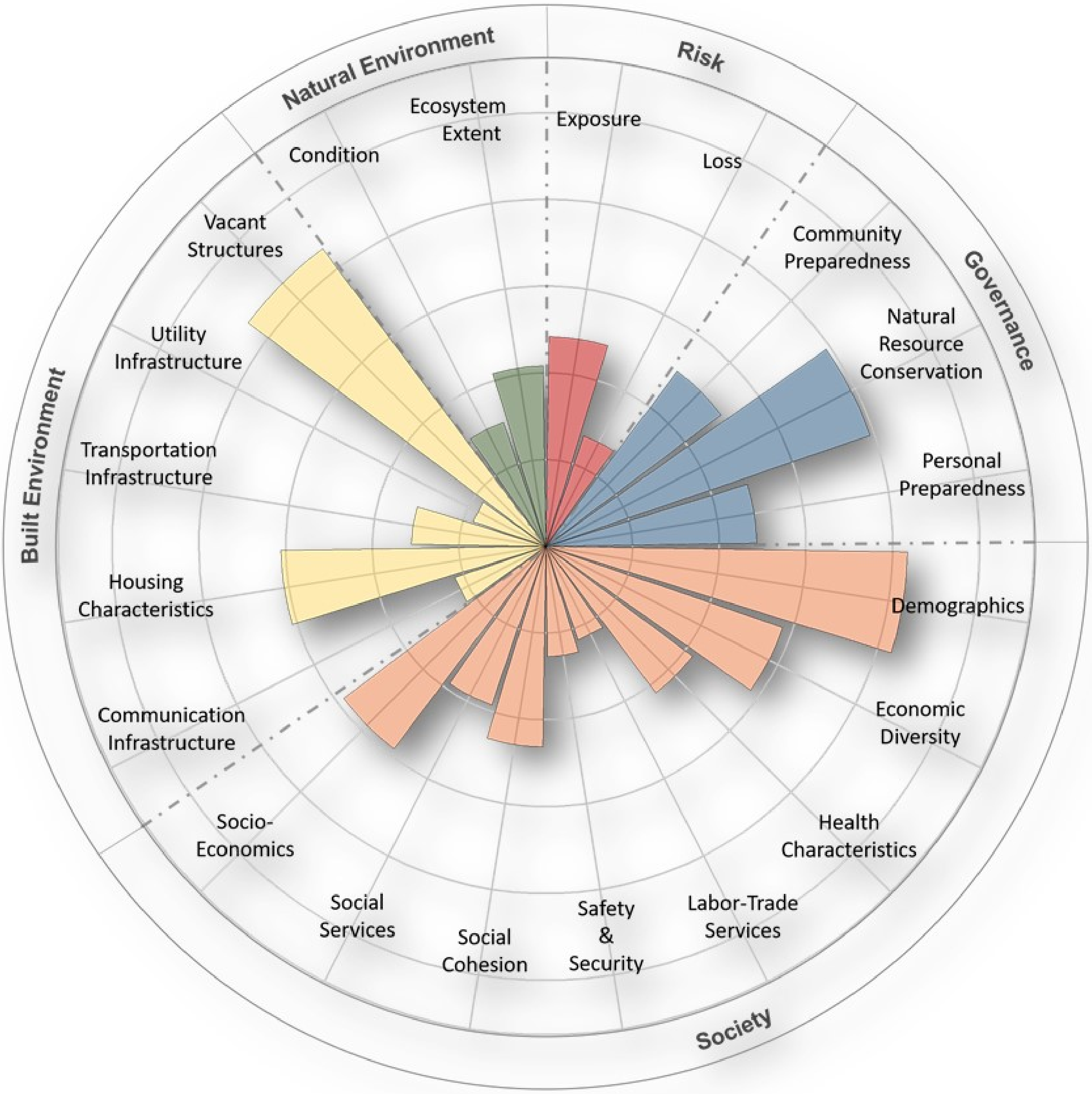


Figure 4.14 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 3. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

EPA Region 4

EPA Region 4 includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Region 4 serves six federally recognized tribes in the southeast. This region is threatened by sea level rise and extreme heat. Inland cities, such as Atlanta, GA, have suffered from rising temperature and extreme heat. Broward and Miami-Dade Counties in Florida have already been impacted by sea level rise, and infrastructure damage from storms. Miami- Dade County, FL has also suffered related issues with water quality and quantity as saltwater intrusion increases with sea level rise. The EPA Region 4 Climate Change Adaptation Implementation Plan of 2014 (USEPA-R4 2014) lists encouraging low-impact development and green infrastructure to abrogate increased storm events; ensuring water conservation and efficiency are considered in water resource project permitting to protect water quality and quantity; using dredge material to protect from sea level rise and storm surge, and developing protocols for emergency dredging after hurricanes since they may become more frequent or severe.

A summary of the EPA Region 4 CRSI and domain scores are shown in Figure 4.27. The overall CRSI, 1.443, is well below the national average and ranked lowest among EPA Regions. The CRSI values reflects higher than average risk to natural hazard events, significantly lower Governance associated with natural hazard events, and significantly lower than average Society and Built Environment and lower than average Natural Environment domain scores. Figure 4.28 shows the distribution of these scores among the counties in Region 4. The higher CRSI values are shown in some coastal North Carolina and some Gulf of Mexico coastal counties in Florida. Areas of high risk to natural hazard events are seen in the coastal regions of the Florida peninsula and the southern Appalachians. Lower risk scores are seen in much of Georgia and the Big Bend area of Florida. Governance scores in Region 3 are higher in northern Kentucky and lowest in Appalachia and much of Alabama. Strong Built Environment domain scores are seen in mid- and south peninsula Florida.

Table 4.5 lists the 25 counties in EPA Region 4 with the highest CRSI values. The higher scores are seen in counties in North Carolina (11), South Carolina (5), Georgia (3), Florida (3) and Kentucky (1). The counties with lower CRSI values occur almost exclusively in Georgia and in one county in Kentucky.

Risk due to natural hazard events across Region 4 risk is examined in more detail in Figure 4.29. Natural exposures due to natural hazard events are dominated by tornadoes, low and high temperatures, inland flooding, high wind, hail and drought in all counties of Region 4. All other types of exposure due to natural hazard events occur in Region 4 in 12-35% of its counties. RCRA (Recovery Conservation and Recovery Act) sites and Superfund sites represent a majority of the technological exposure indicator at 53% and 21% of counties, respectively. Nuclear sites also contribute a small portion of the risk potential at 5% of counties. Natural hazard risk potential dominates the region, with only 4% of the risk being attributable to technological exposure potential. Risk ranges from a low score of 0.06 in Talbot, Terrell and Turner Counties, Georgia to a high score of 0.99 in Shelby County, Tennessee. The mean regional risk (0.255) falls slightly above the national average of 0.229.

Contributions of CRSI’s twenty indicators to the overall Region 4 domain scores is displayed in Figure 4.30. The strongest positive influences on the domain scores in Region 4 include vacant structures and housing characteristics (Built Environment), and demographic characteristics (Society). Secondary influences are seen in community preparedness and natural resource conservation (Governance), economic diversity, social cohesion and socio-economic characteristics (Society), and exposure to natural hazard events. Lower indicator scores are seen for safety and security and labor-trade services (Society), and utility and communications infrastructure (Built Environment).

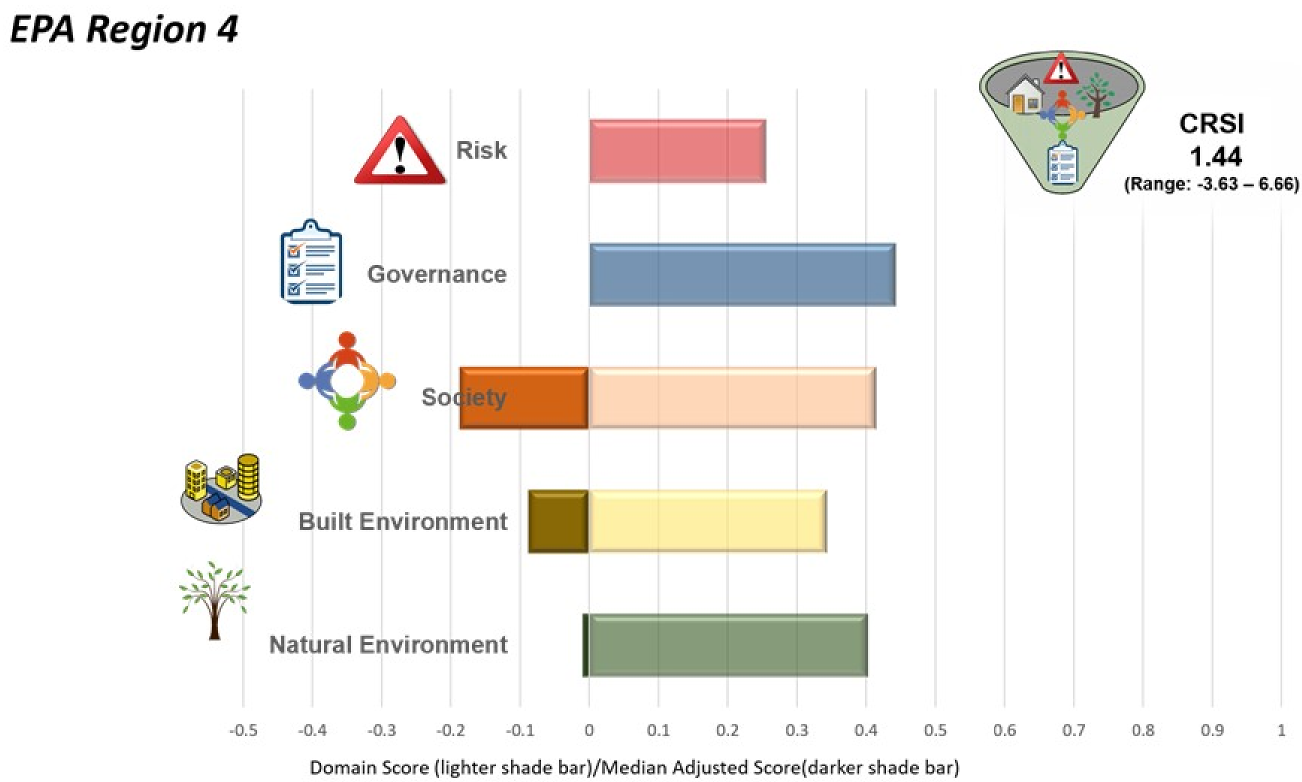


Figure 4.15 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 4, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

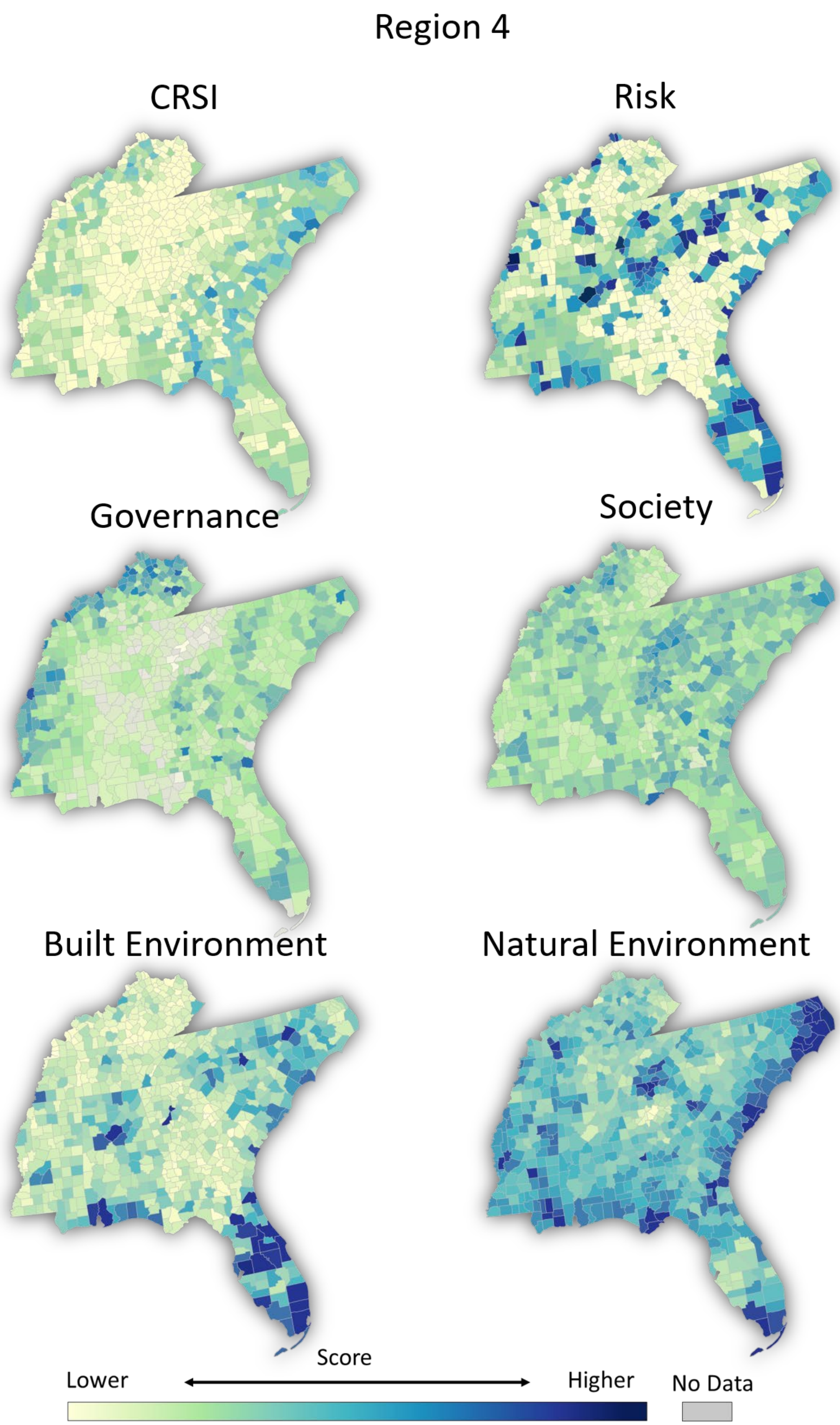


Figure 4.28 The distributions of EPA Region 4 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.5 Twenty-five counties in EPA Region 4 with the highest CRSI values.

Region 4	
Rank	**County**
1.	Pender, North Carolina
2.	Washington, Georgia
3.	Jefferson, Florida
4.	Columbus, North Carolina
5.	Northampton, North Carolina
6.	Evans, Georgia
7.	Spencer, Kentucky
8.	Bertie, North Carolina
9.	Sampson, North Carolina
10.	Worth, Georgia
11.	Tattnall, Georgia
12.	Duplin, North Carolina
13.	Colleton, South Carolina
14.	Grady, Georgia
15.	Yadkin, North Carolina
16.	Martin, North Carolina
17.	Halifax, North Carolina
18.	Williamsburg, South Carolina
19.	Thomas, Georgia
20.	Orangeburg, South Carolina
21.	Colquitt, Georgia
22.	Levy, Florida
23.	Franklin, Florida
24.	Gates, North Carolina
25.	Appling, Georgia

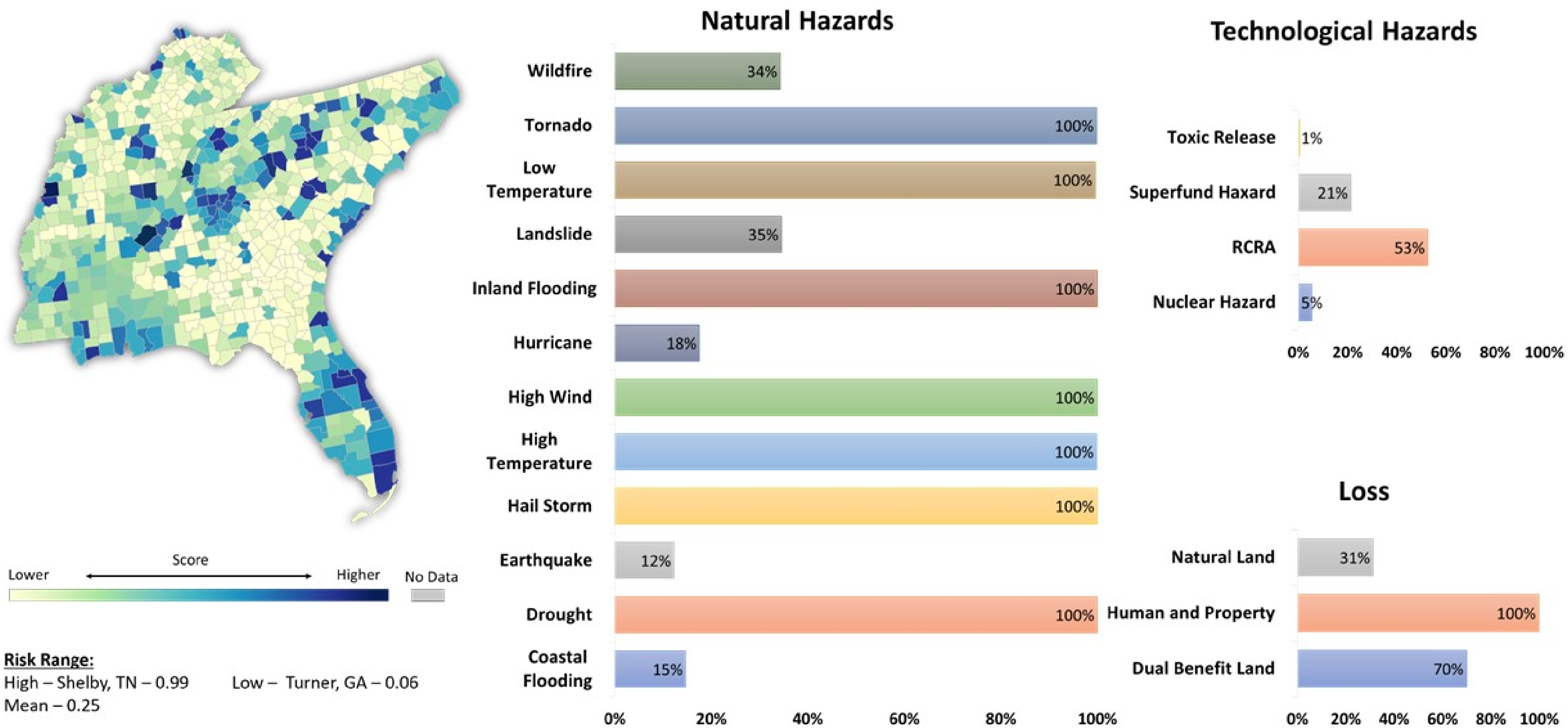


Figure 4.16 Map of Risk Domain scores by county for Region 4; proportion of natural exposures by climate event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

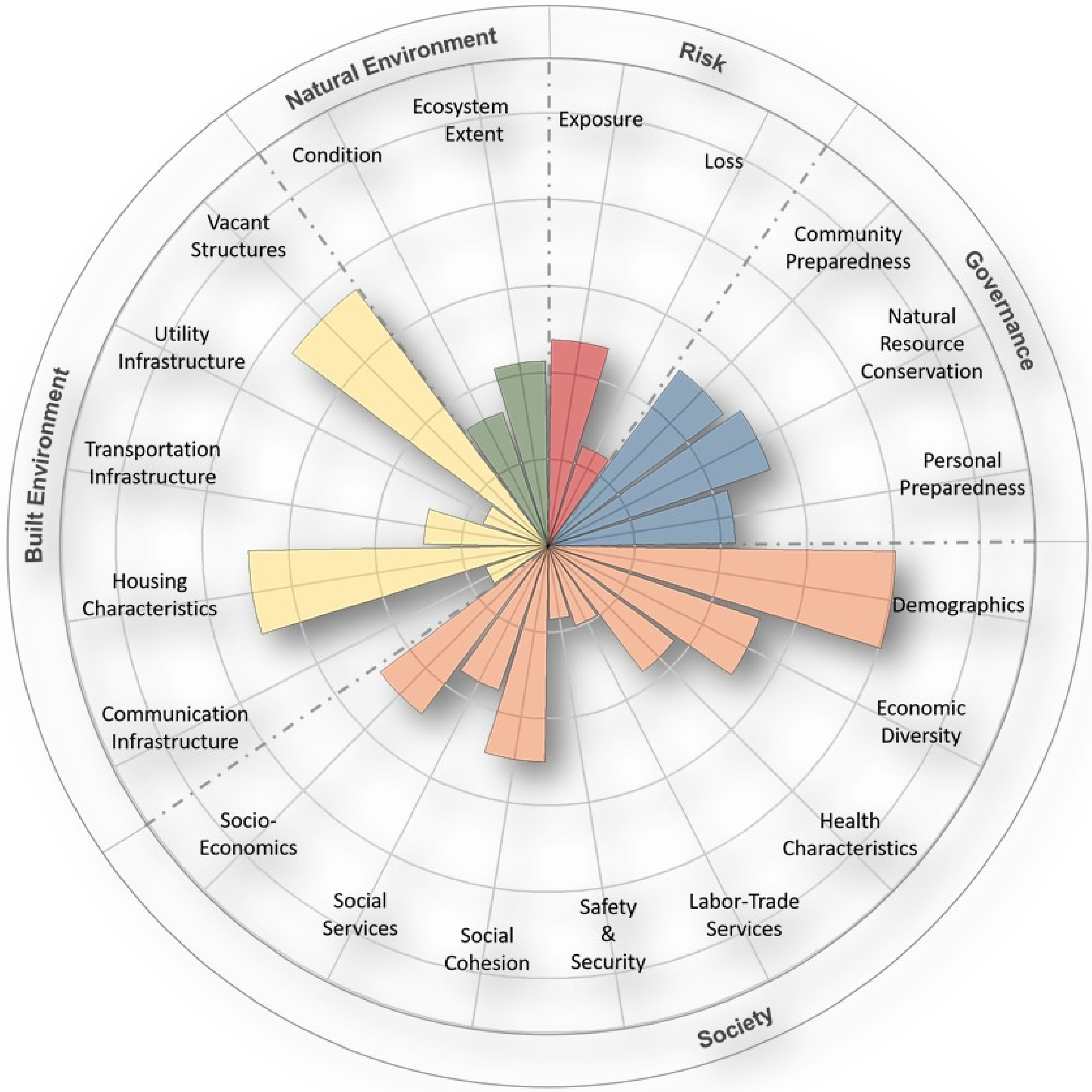


Figure 4.17 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 4. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

<u>EPA Region 5</u>

Region 5 of the EPA includes Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Region 5 serves 35 federally recognized tribes in Michigan, Minnesota and Wisconsin. Region 5 is impacted by extreme rainfall events that lead to flooding, and extreme heat. Minneapolis, MN has been affected by warming trends, and flooding from extreme rainfall. Milwaukee, WI has suffered both cases of severe drought and extreme rainfall that resulted in flooding and infrastructure damage. Grand Rapids, MI and

Chicago, IL have both experienced rises in temperature, and extreme rainfall resulting in flooding, erosion and infrastructure damage. Chicago has additional resilience issues of endemic crime, public health, and infrastructure failure. Ann Arbor, MI is forecasted to suffer from rising temperatures. The EPA Region 5 Climate Change Adaptation Implementation Plan of May 2014 (USEPA-R5 2014) states that Region 5 is striving to use water source protection tools in order to improve the resilience of highly vulnerable water systems. Additionally, remediation techniques for incorporating vegetation are in review in order to become more tolerant of heat, excessive rain, and drought in the EPA's Superfund processes.
A summary of the overall CRSI score and the domain scores for EPA Region 5 is shown in Figure 4.31. The overall CRSI value of 5.476 is above the national average while the Risk domain score is slightly lower than the national average (less risk). The Region 5 Governance domain score is relatively high as is the Society domain score. The scores for the Built Environment and Natural Environment domains are above the national average. Region 5 CRSI value ranked 5th among the ten EPA Regions.

The distribution of the overall CRSI values and the domain scores among the counties in Region 5 is shown in Figure 4.32. Higher CRSI values, as shown in Figure 4.32 and Table 4.6, occur in the counties of Wisconsin (10 counties), Indiana (3), Minnesota (7), Michigan (5) and Indiana (3). The counties with the lower CRSI values (< 1.00) occur in Illinois (31), Indiana and Ohio (3 counties each), Michigan (2) and Minnesota (1). Risk domain scores are generally the lowest in northern Minnesota, northern Michigan and northwestern and middle Wisconsin. The highest risk domain scores occur along the southwestern shore of Lake Michigan. Governance and Society domain scores are higher in many of the counties of Wisconsin and Minnesota.

Risk due to natural hazard events across Region 5 risk is examined in more detail in Figure 4.33. Natural exposures due to high and low temperatures, tornadoes, inland flooding high wind, hail and drought occur in all Region 5 counties. Landslides and wildfires occur in 28% and 25% of counties, respectively, while earthquakes occur in 7% of counties in Region 5. RCRA and Superfund dominated the technological exposure indicator at 57% and 38% of counties, respectively. Nuclear exposure potential is also a significant contributor to risk in this region in 5% of counties. Risk ranges from a low score of 0.046 in Oceana County, Michigan to 0.779 in Will County, Illinois, with a regional average score of 0.222 which is slightly lower than the national average (0.229).

The contributions of the 20 indicators to EPA Region 5 domain scores are shown in Figure 4.34. The strongest contributors to domain scores are natural resource conservation (Governance), demographic characteristics (Society), and vacant structures (Built Environment). Secondary contributors include economic diversity, social cohesion, socio-economic characteristics and health characteristics (Society), housing characteristics (Built Environment), and personal and community preparedness (Governance). Lower indicator scores are shown for communication and utilities infrastructure in the Built Environment domain and safety and security and labor and trade services in the Society domain.

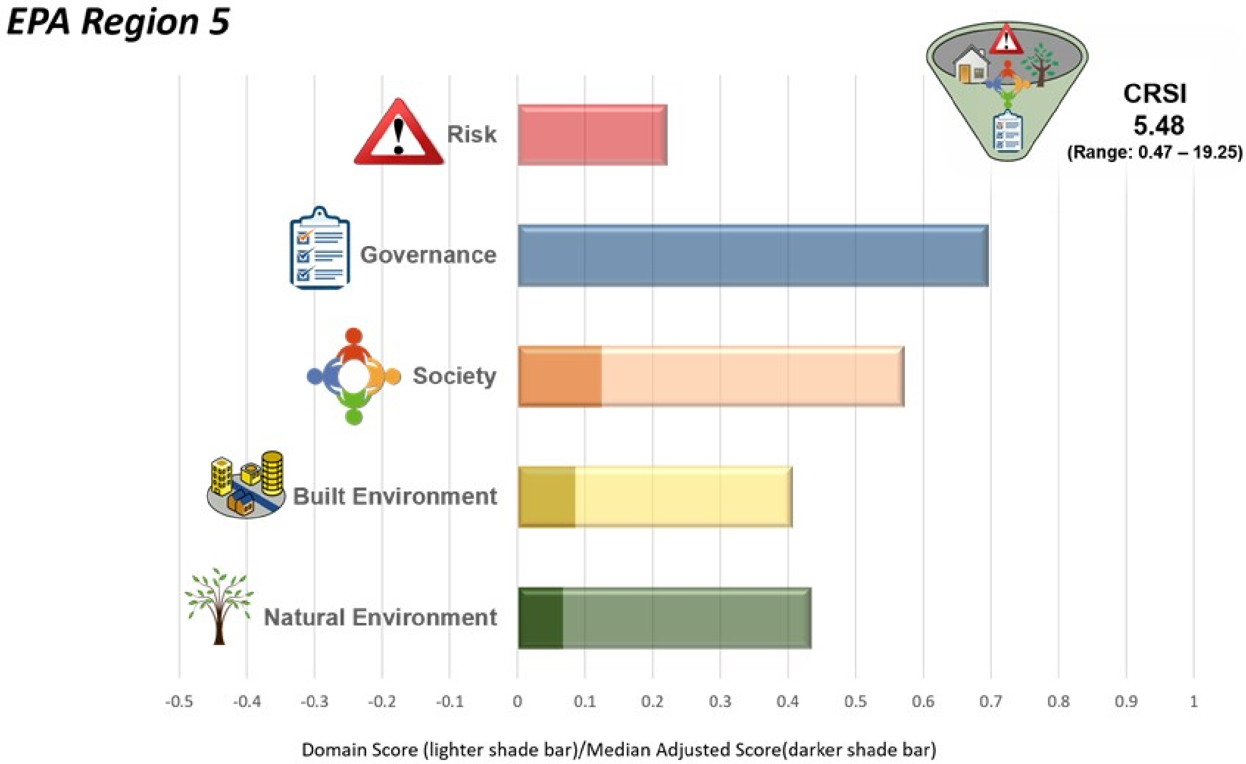


Figure 4.18 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 5, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

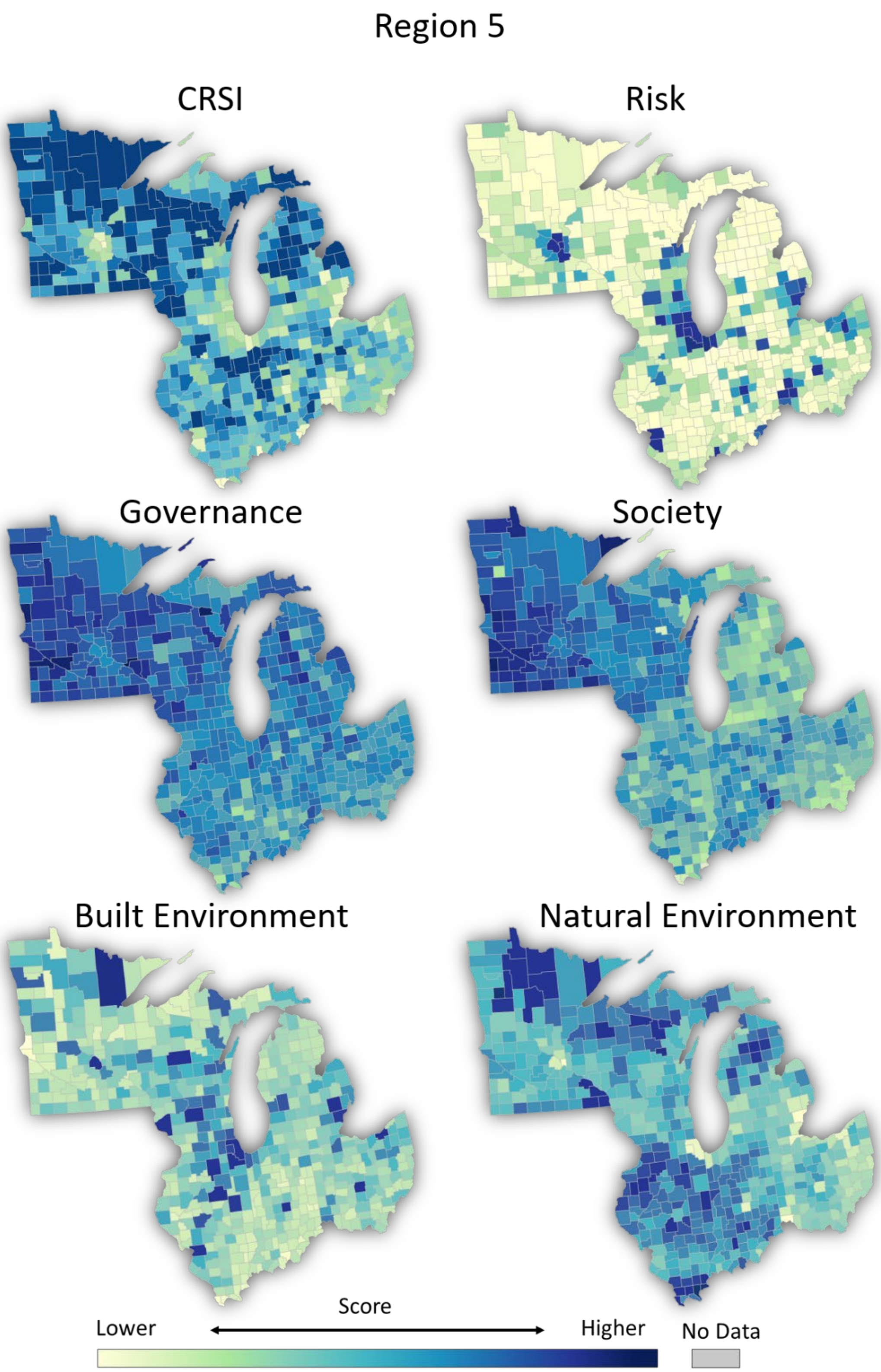


Figure 4.32 The distributions of EPA Region 5 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.6 Twenty-five counties in EPA Region 5 with the highest CRSI values.

Region 5	
Rank	**County**
1.	Lincoln, Minnesota
2.	Itasca, Minnesota
3.	Florence, Wisconsin
4.	Newton, Indiana
5.	Sawyer, Wisconsin
6.	Kalkaska, Michigan
7.	Oneida, Wisconsin
8.	Oceana, Michigan
9.	Vilas, Wisconsin
10.	Pipestone, Minnesota
11.	Koochiching, Minnesota
12.	Price, Wisconsin
13.	Washburn, Wisconsin
14.	Fillmore, Minnesota
15.	Shawano, Wisconsin
16.	Forest, Wisconsin
17.	Benton, Indiana
18.	Huron, Michigan
19.	Morrison, Minnesota
20.	Sanilac, Michigan
21.	Pulaski, Indiana
22.	Grant, Minnesota
23.	Ashland, Wisconsin
24.	Missaukee, Michigan
25.	Polk, Wisconsin

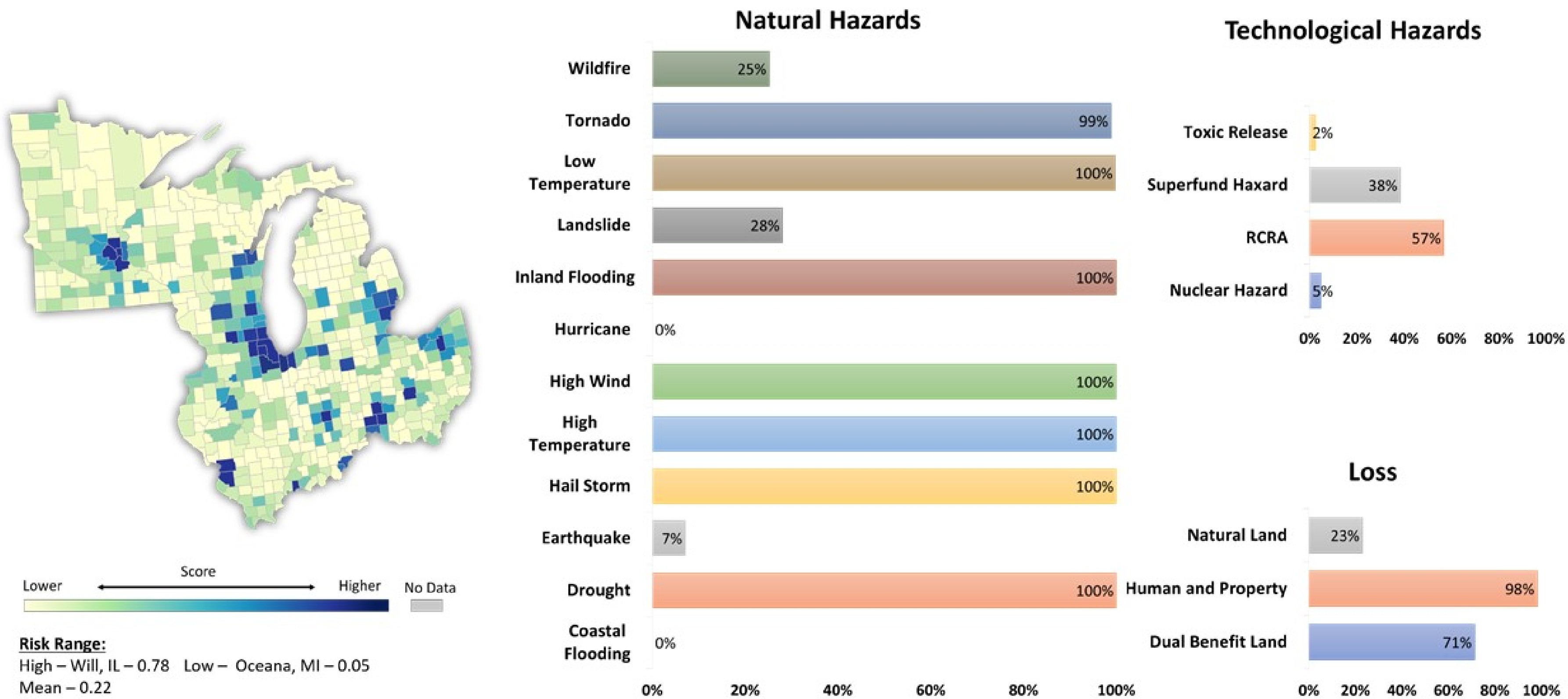


Figure 4.19 Map of Risk Domain scores by county for Region 5; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region

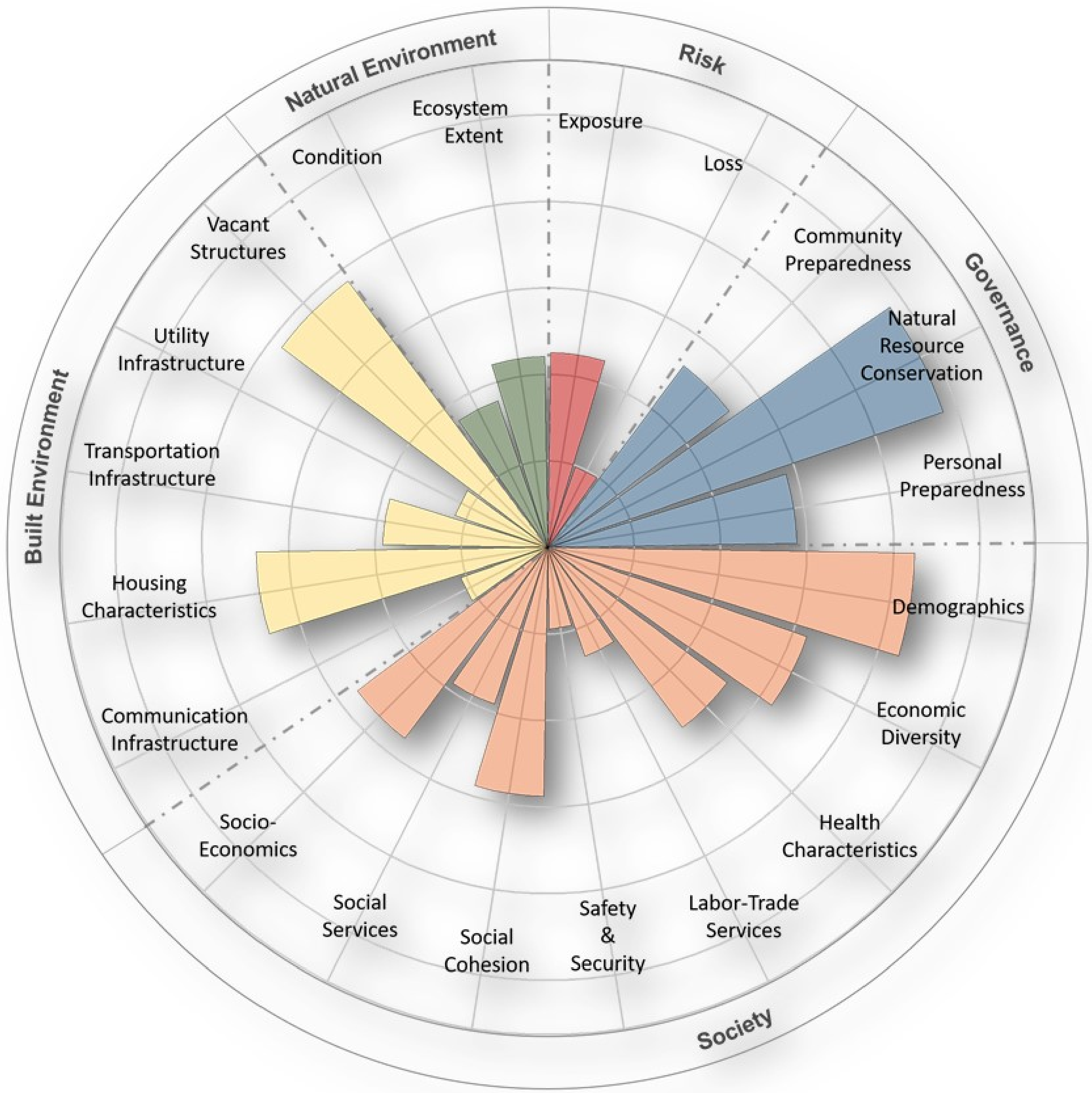


Figure 4.20 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 5. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

<u>EPA Region 6</u>

Region 6 of the EPA serves Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. Region 6 includes 66 federally recognized tribes in Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. The entire region is threatened by extreme heat events and rising temperatures. For example, Tucson, AZ, Houston, TX, Dallas, TX, and El Paso, TX, have all experienced different issues due to warming trends. In cities where the heat has been, or is projected to be, accompanied by drought, such as Houston, El

Paso and Tucson, water quality and quantity sometimes becomes a concern. In New Mexico rising temperatures, combined with drought, and insect outbreaks, has led to increased wildfire risk. In Dallas, TX heat waves have caused energy shortages. In Houston, TX, Dallas, TX, and El Paso, TX there has been extreme rainfall and flooding too, resulting in erosion and damages to infrastructure in Houston; and infrastructure damage and even failure in Dallas. The Region's coastal states, specifically Louisiana, are threatened by sea level rise. New Orleans, LA has not only suffered infrastructure damage and failure, but has also had issues with storm surge and erosion. Some cities in the region face other compounding resilience issues such as social inequity in El Paso, TX and Tucson, AZ, and severe drug and alcohol abuse in El Paso. The EPA Region 6 Climate Change Adaptation Implementation Plan of May 2014 (USEPA-R6 2014) suggested mitigating the impact of sea level rise and coastal land loss to erosion using restoration projects developed and implemented through three National Estuary Programs in the region, Climate Ready Estuaries Programs, and the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA); with a goal of protecting or restoring 9,000 acres of coastal wetlands.
A summary of the EPA Region 6 overall CRSI and the domain scores is depicted in Figure 4.35. The overall CRSI score of 3.06 is significantly less than the national average ranks 8th among EPA Regions. The score appears to be the result of lower than average Governance for natural hazard events and a lower than average score for the Society domain and average scores for Built Environment and Natural Environment domains. The distribution of these scores across the counties of Region 6 is shown in Figure 4.36. The higher CRSI values in EPA Region 6 are in New Mexico and some scattered counties in Texas and Oklahoma. The highest scores for the risk domain occur in coastal Louisiana, northeastern coastal Texas and central Oklahoma. Higher Governance and Society domain scores occur in northern Oklahoma and New Mexico. Table 4.7 lists the 25 counties with the highest CRSI values in EPA Region 6. These counties are in New Mexico (14), Texas (10) and Oklahoma (1). The counties with the lowest CRSI values are in Texas (9) and Oklahoma (1).

Risk due to natural hazard events across Region 6 risk is examined in more detail in Figure 4.37. Natural exposures due to High and low temperatures, tornadoes, inland flooding, high wind, hail and drought occur in virtually all Region counties\. Wildfires occur in nearly half of the counties (45%) and all other hazards occur in 6-22% of region 6 counties. RCRA (Resource Conservation and Recovery Act) and Superfund sites represent a majority of the technological exposure indicator at 31% and 18% of counties, respectively. Most of exposure comes from natural hazard events, with only 2% resulting from proximity to anthropogenic, technologic infrastructure. Region 6 risk ranges from the lowest score of 0.062 in the Winkler County, Texas to one of the higher scores in the nation, 0.907 in Ascension Parish, Louisiana with a regional average (0.239) slightly higher than the national average at 0.229.

The contributions of the 20 indicators to the domains that comprise CRSI are shown in Figure 4.38 for EPA Region 6. The natural resource conservation indicator score is the strongest contributor to the Governance domain. Secondary contributions are associated with vacant structures and housing characteristics (Built Environment), and demographic characteristics (Society). Weaker contributors are transportation and communications infrastructure scores in the Built Environment domain and (Built Environment), and labor-trade services scores in the Society domain.

EPA Region 6

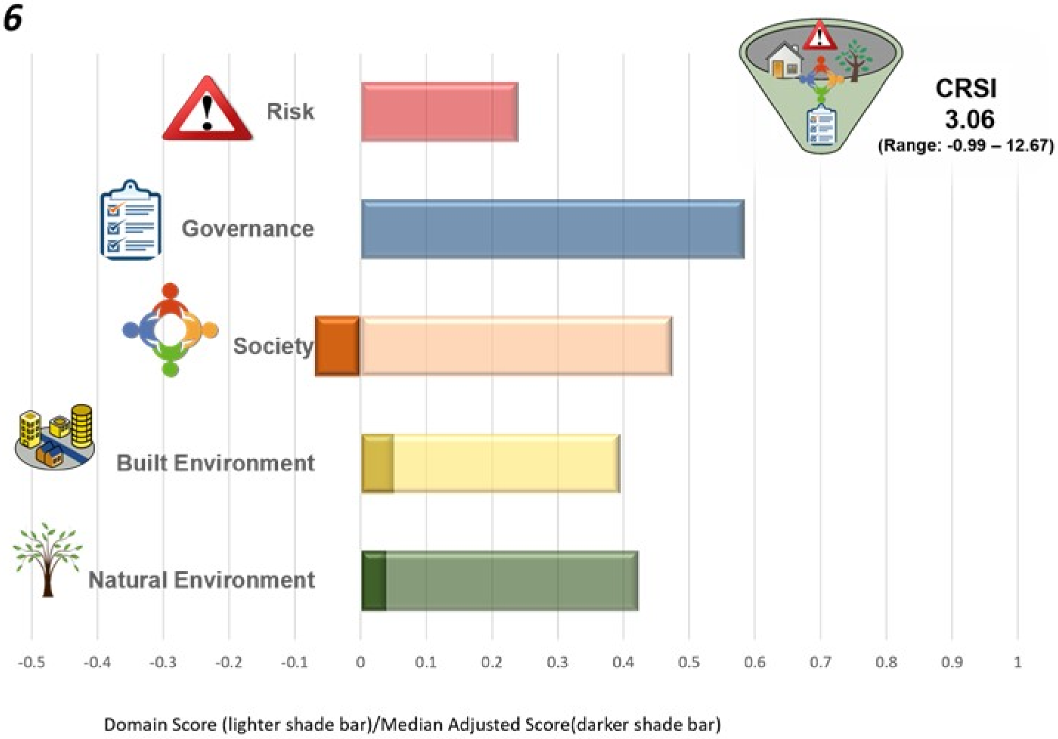


Figure 4.21 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for the U.S, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

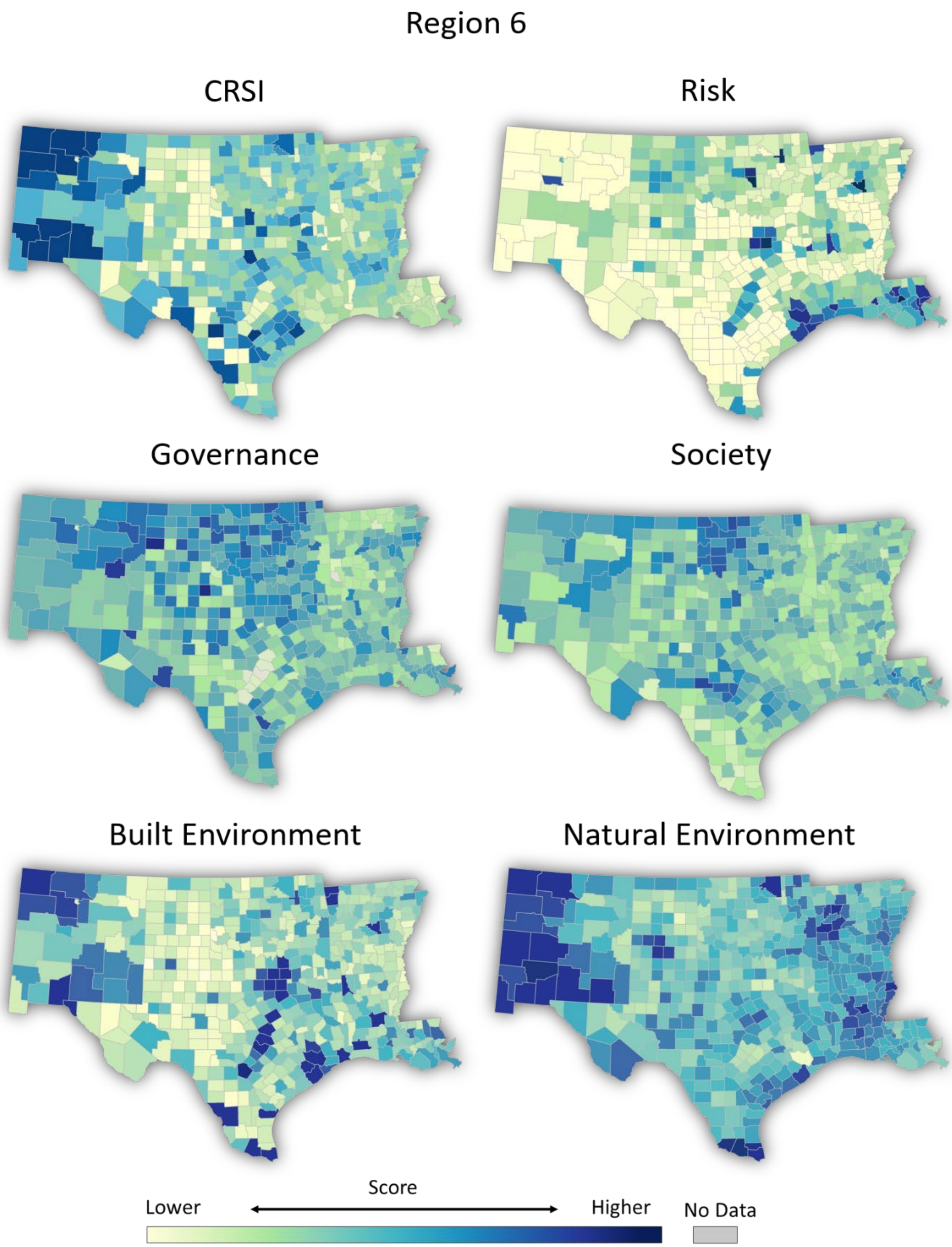


Figure 4.36 The distributions of EPA Region 6 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.7 Twenty-five counties in EPA Region 6 with the highest CRSI values.

Region 6	
Rank	**County**
1.	McKinley, New Mexico
2.	San Juan, New Mexico
3.	Luna, New Mexico
4.	Sierra, New Mexico
5.	Wilson, Texas
6.	Grant, New Mexico
7.	Otero, New Mexico
8.	Sandoval, New Mexico
9.	Rio Arriba, New Mexico
10.	Uvalde, Texas
11.	Erath, Texas
12.	Doña Ana, New Mexico
13.	Taos, New Mexico
14.	Wharton, Texas
15.	Clay, Texas
16.	Webb, Texas
17.	Cibola, New Mexico
18.	Santa Fe, New Mexico
19.	Val Verde, Texas
20.	Quay, New Mexico
21.	Torrance, New Mexico
22.	Wise, Texas
23.	Osage, Oklahoma
24.	Live Oak, Texas
25.	Bee, Texas

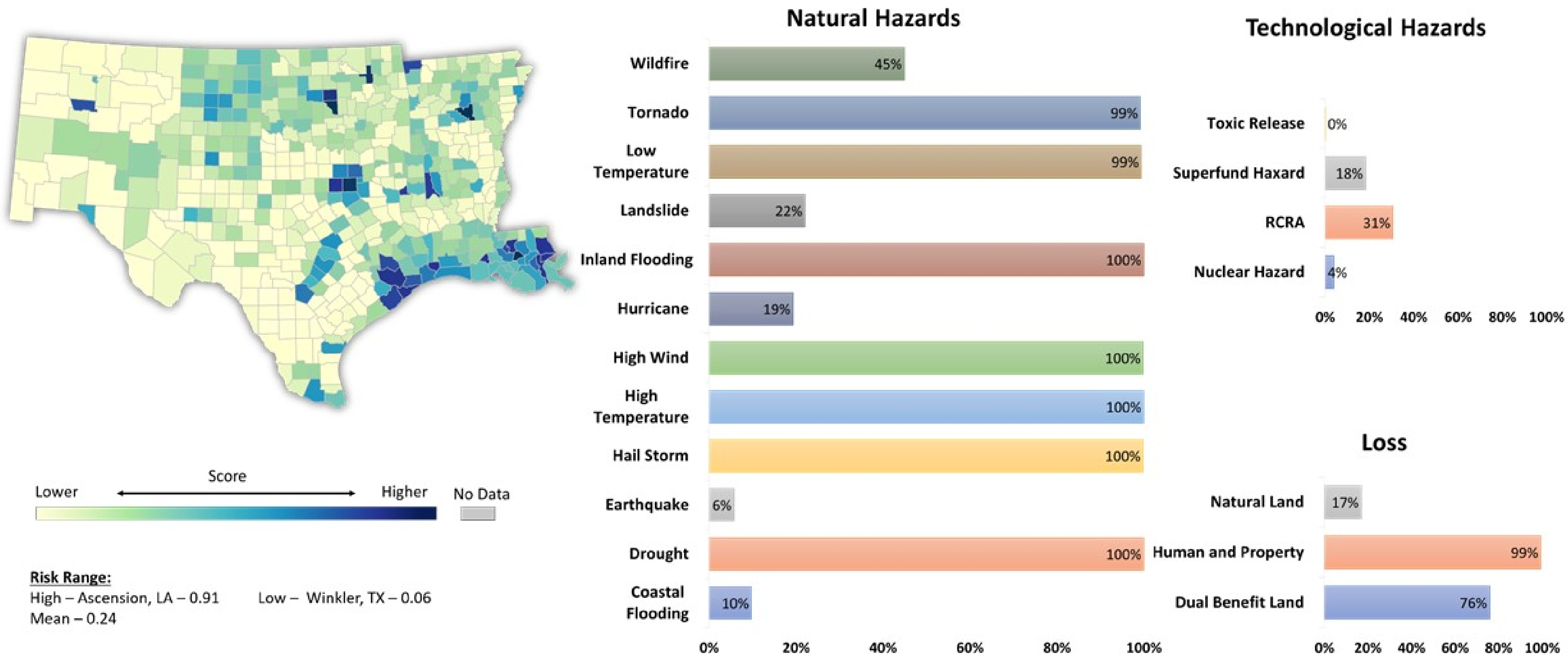


Figure 4.22 Map of Risk Domain scores by county for Region 6; proportion of natural exposures by climate event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

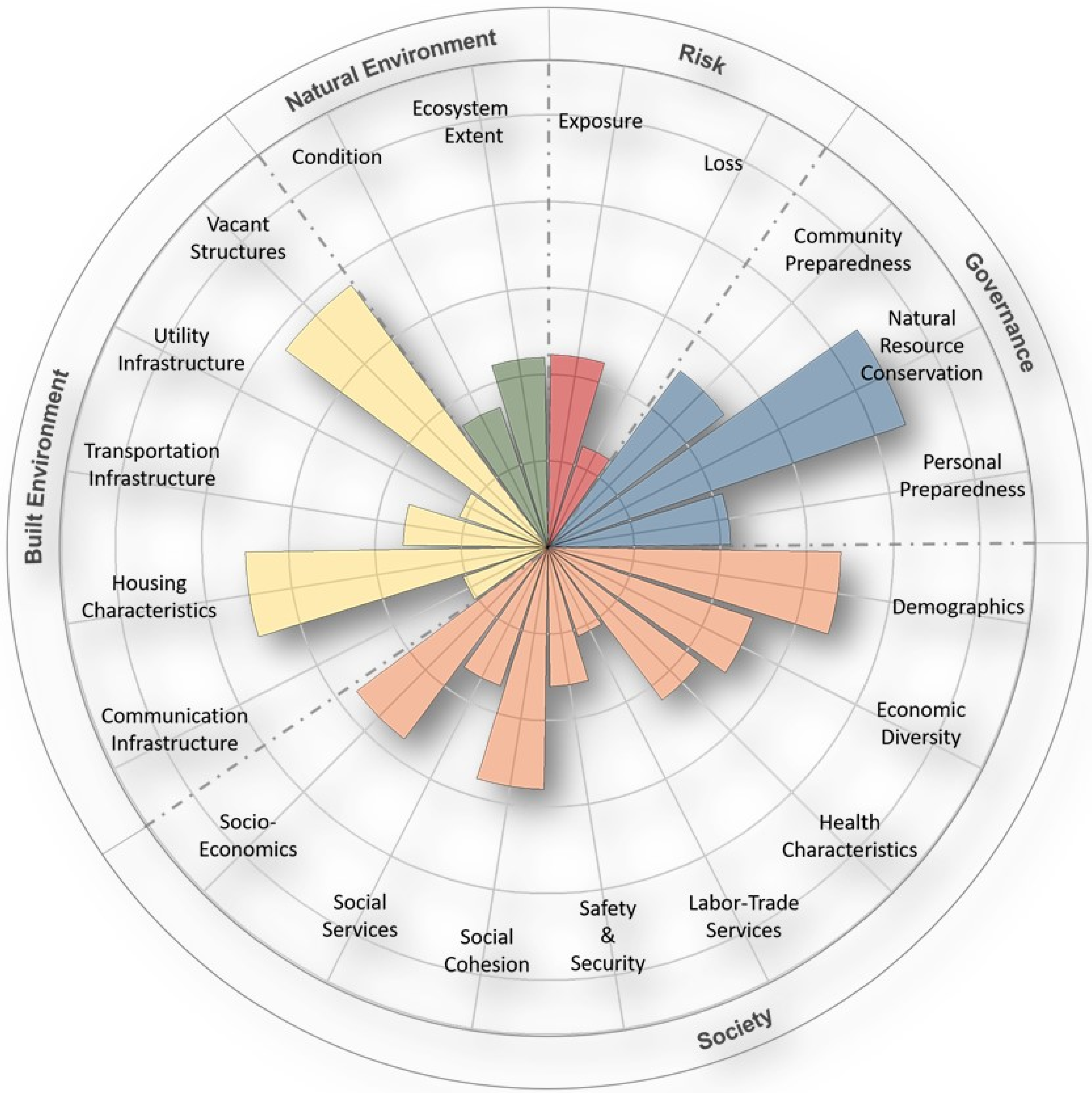


Figure 4.23 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 6. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

<u>EPA Region 7</u>

Region 7 of the EPA serves Iowa, Kansas, Missouri, and Nebraska. Region 7 serves 7 federally recognized tribes in Kansas, Nebraska, and Iowa. All of Region 7 has experienced extreme heat and rising temperatures, in some instances creating increased demand for resources such as water and energy. Parts of the region have also witnessed extreme rainfall events, and flooding. Dubuque, IA has suffered crop failures due to extreme heat and severe drought, and infrastructure damages due to extreme rainfall and flooding. St. Louis, MO is projected to experience these same impacts of extreme heat and rainfall events, with the additional concern that rainfall will cause additional erosion. St. Louis has other resilience issues, such as social inequity, endemic crime, and civil unrest. Most of the actions being taken by Region 7 under the regional Climate Change Adaptation Implementation Plan (USEPAR7 2014) are focused on the availability of water. Actions include prioritizing watershed improvements to sources of drinking water impacted by nutrients and other contaminants, promoting precipitation neutral technologies and practices for site remediation, and helping work within the region to incorporate water conservation practices, energy conservation and green infrastructure.

A summary of the overall CRSI score and the domain scores for EPA Region 7 are provided in Figure 4.39. The overall CRSI score of 4.469 is slightly above the national average and ranks 6th among the EPA Regions. While the Risk domain score is relatively low (0.209), the Governance and Society domain scores are relatively high. The Built Environment and Natural Environment domain scores are lower than the national average. Figure 4.40 shows the spatial distribution of these domain scores across the counties comprising EPA Region 7. Table 4.8 shows the highest CRSI values are scattered through the region with the highest county scores occuring in Iowa and Kansas (8 counties each), Missouri (7) and Nebraska (1). The counties with lower CRSI values (< 1.0) are primarily in Nebraska (19 counties), Missouri (4), and one county in Kansas. Lower Governance scores are seen in southern Missouri. Risk due to natural hazard events across Region 7 is examined in more detail in Figure 4.41. Natural exposures due to natural hazard events are dominated by tornadoes, high and low temperatures, drought, hail and high wind in all counties. Wildfires occurred in 25% of counties while earthquakes and landslides occurred in 6-8% of counties. RCRA and Superfund sites evenly influenced the technological exposure indicator at 25% and 17%, respectively. Most risk exposure comes from natural hazard events, with only 3% resulting from proximity to anthropogenic, technology. Risk ranges from a low score of 0.05 in Pierce County, Nebraska to 0.853 in St. Louis City, Missouri with a regional average((0.21) being slightly under the national of 0.229.

The contributions of the twenty indicators to the overall domain scores for EPA Region 7 are shown in Figure 4.42. The strongest contributors are natural resource conservation scores (Governance), and vacant structures (Built Environment). Secondary contributors are the housing characteristics indicator score in the Built Environment domain and demographic characteristics, social cohesion, socioeconomic characteristics, economic diversity and health characteristics indicator scores in the Society domain. Communication and utility infrastructures scores (Built Environment), and safety and security scores (Society) are weaker contributors.

Figure 4.24 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 7, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

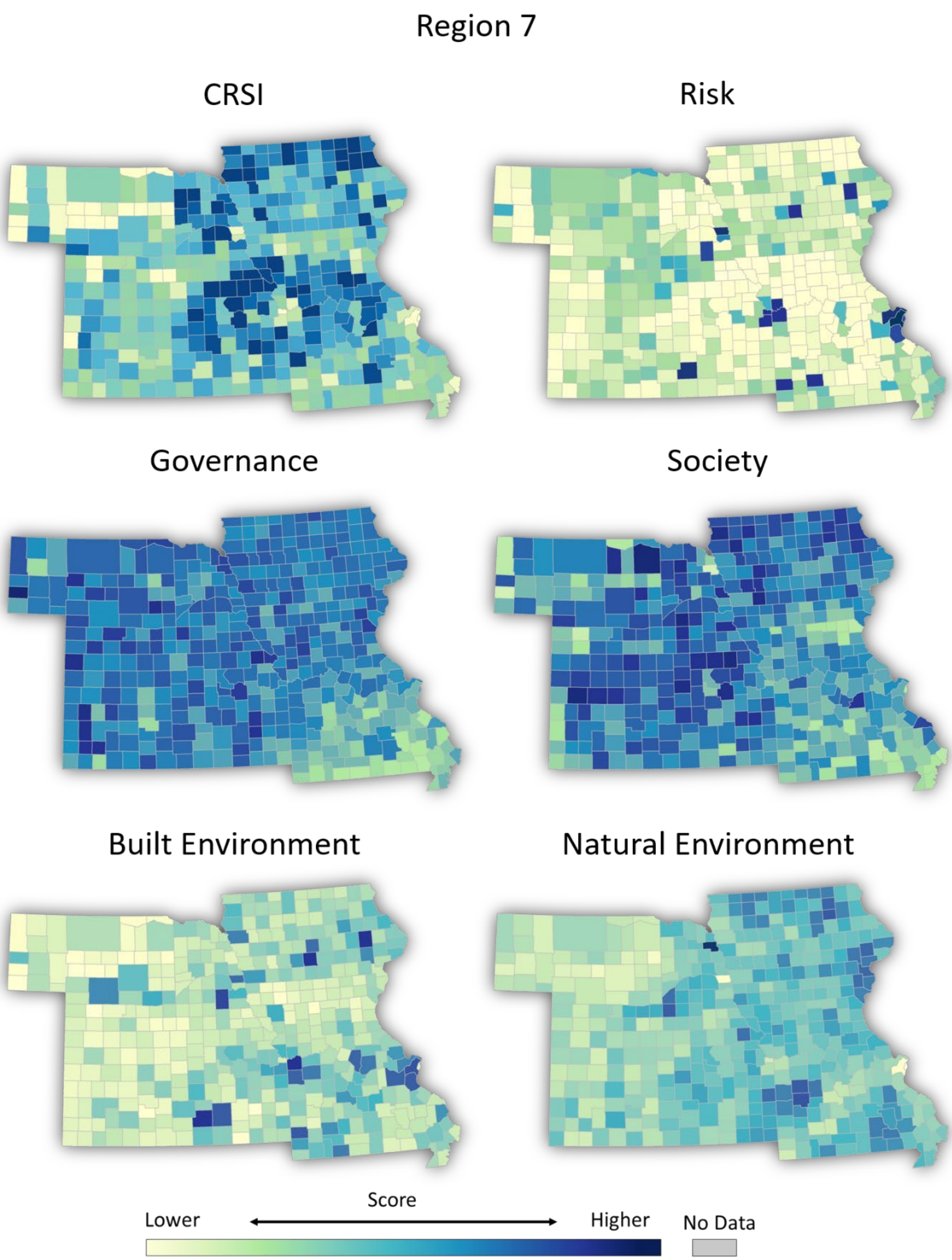


Figure 4.40 The distributions of EPA Region 7 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.8 Twenty-five highest CRSI values in the counties of EPA Region 7.

Region 7	
Rank	**County**
1.	Pierce, Nebraska
2.	Chickasaw, Iowa
3.	Wabaunsee, Kansas
4.	Marshall, Kansas
5.	Richardson, Nebraska
6.	Clayton, Iowa
7.	Winneshiek, Iowa
8.	Ottawa, Kansas
9.	Fayette, Iowa
10.	Macon, Missouri
11.	Brown, Kansas
12.	Miami, Kansas
13.	Washington, Iowa
14.	Shelby, Missouri
15.	Nodaway, Missouri
16.	Shelby, Iowa
17.	Bremer, Iowa
18.	Washington, Kansas
19.	Lafayette, Missouri
20.	Clinton, Missouri
21.	Nemaha, Kansas
22.	Vernon, Missouri
23.	Cherokee, Iowa
24.	Pottawatomie, Kansas
25.	Osage, Missouri

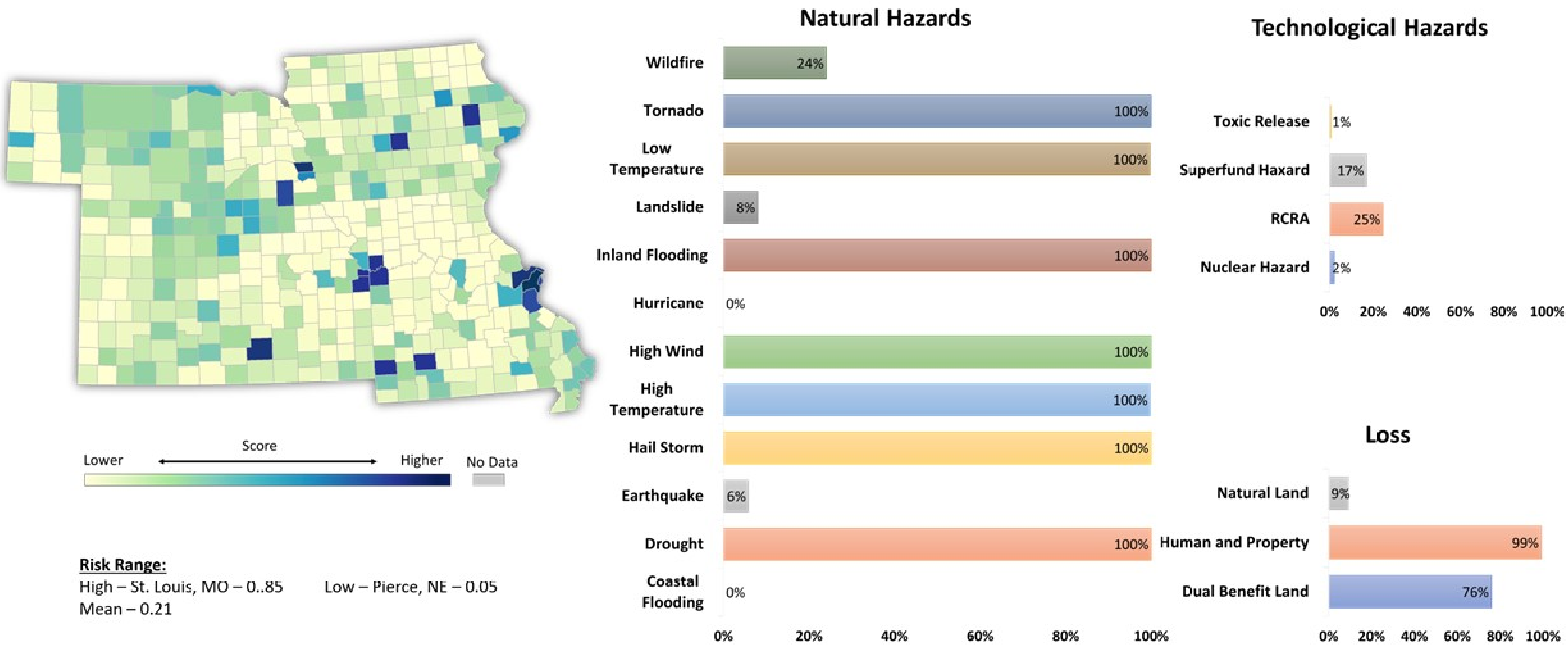


Figure 4.25 Map of Risk Domain scores by county for Region 7; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

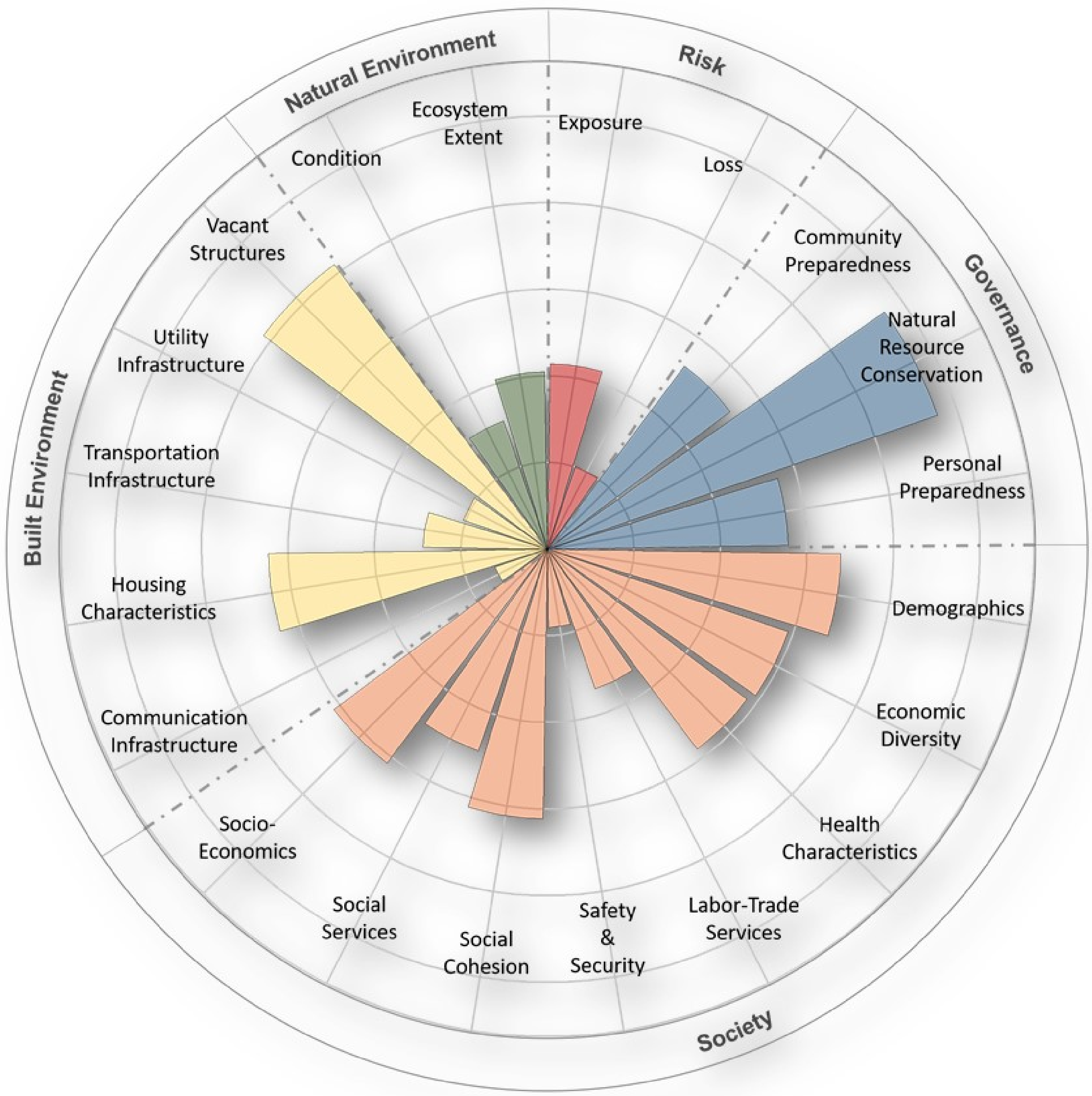


Figure 4.26 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 7. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

EPA Region 8

Region 8 of the EPA includes Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Region 8 serves 27 federally recognized tribes, located in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. The Region is threatened by extreme heat events and rising temperatures and at risk of increased demand for energy and water resources as a result. These rising temperatures in combination with drought and insect outbreaks, has increased the risk of wildfire for some parts of the region, specifically Utah and Colorado. Boulder and Colorado Springs, CO have both experienced temperature rises, extensive wildfires, air quality issues, and damages to infrastructure. Boulder, CO has experienced extreme rainfall and flooding too. In Boulder, both extreme heat and extreme rainfall have to be considered alongside other resilience issues like invasive species, disease and affordable housing. Denver, CO has experienced extreme heat, temperature rises and air quality issues, but not wildfires or infrastructure damage. It is projected that Denver will eventually experience extensive wildfires as well. Salt Lake City, UT is forecasted to face extreme heat and temperature rises potentially leading to wildfire risks, and water quality and quantity concerns. Efforts to improve resilience in EPA Region 8 include working with states and tribal nations to integrate climate considerations into their water programs and consider how funding mechanisms may support increased investments in water infrastructure (USEPA-R8 2014).

A summary of the overall CRSI score and the domain scores for EPA Region 8 is provided in Figure 4.43. The CRSI value for Region 8 is 6.477, above the national average and ranking 3rd highest among the EPA Regions. This Region also has a low Risk score (0.162) indicating a less risk to acute natural hazard events. The Built Environment domain score is moderate, and the Governance and Society domain scores are well above the national average. The spatial distribution of these scores among the counties in Region 8 is shown in Figure 4.44. Higher overall CRSI values are seen in western Montana, most of Wyoming and along and below the eastern slope of the Rocky Mountains in Colorado. The highest overall CRSI values are shown in Table 4.9 and includes counties in Montana (7 counties), Colorado (6), and South Dakota (5), North Dakota (4), Wyoming (2) and Utah (1). The counties with lower CRSI values (<1.0) are found in South Dakota (6), Colorado (6) and Montana (3) and North Dakota 92). Risk for natural hazard events is relatively low throughout the region.

Risk due to natural hazard events across Region 8 is examined in more detail in Figure 4.45. Natural exposure due to natural hazard events are dominated by high and low temperatures, drought and inland flooding in all Region 8 counties. Other high risk exposures include hail, wind, tornadoes and wildfires (78-98% of counties). Landslides occurred in 66% of counties while earthquakes occurred in 18% of counties. Superfund sites and RCRA sites influence a small number of counties through the technological exposure indicator at 18% and 7%, respectively. RCRA sites have little influence and nuclear exposure potential is non-existent. Most exposure comes from natural hazard events, with only 1% resulting from proximity to technological hazards. Risk ranges from a low score of 0.05 in Toole County, Montana to 0.77 in Salt Lake County, Utah with a regional average (0.16) well under the national at 0.229.
The contributions of the twenty indicators to the domain scores that comprise CRSI shown in Figure 4.46 for Region 8. The strongest contributions come from the natural resource conservation indicator (Governance), and the vacant structures indicator (Built Environment). Secondary contributions come from housing characteristics (Built Environment); socio-economic characteristics, demographic characteristics and health characteristics (Society); and, exposure (risk).

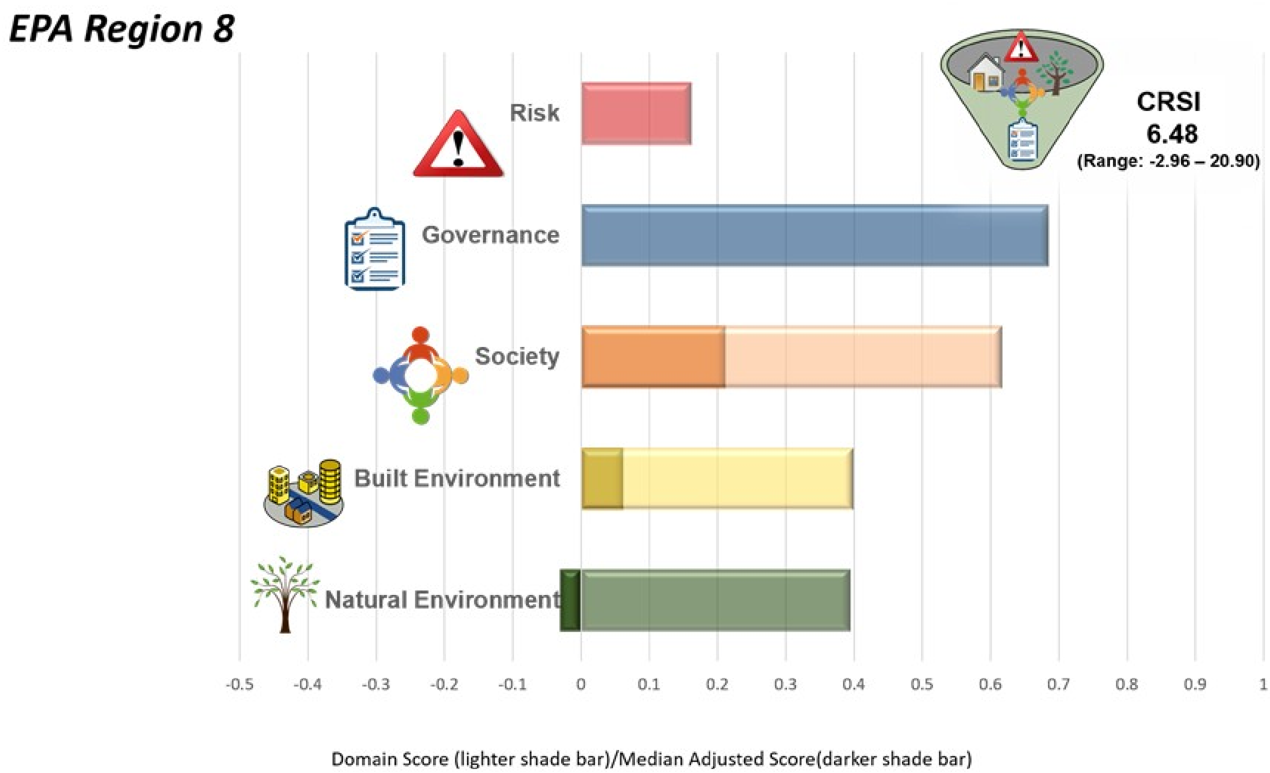


Figure 4.43 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 8, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

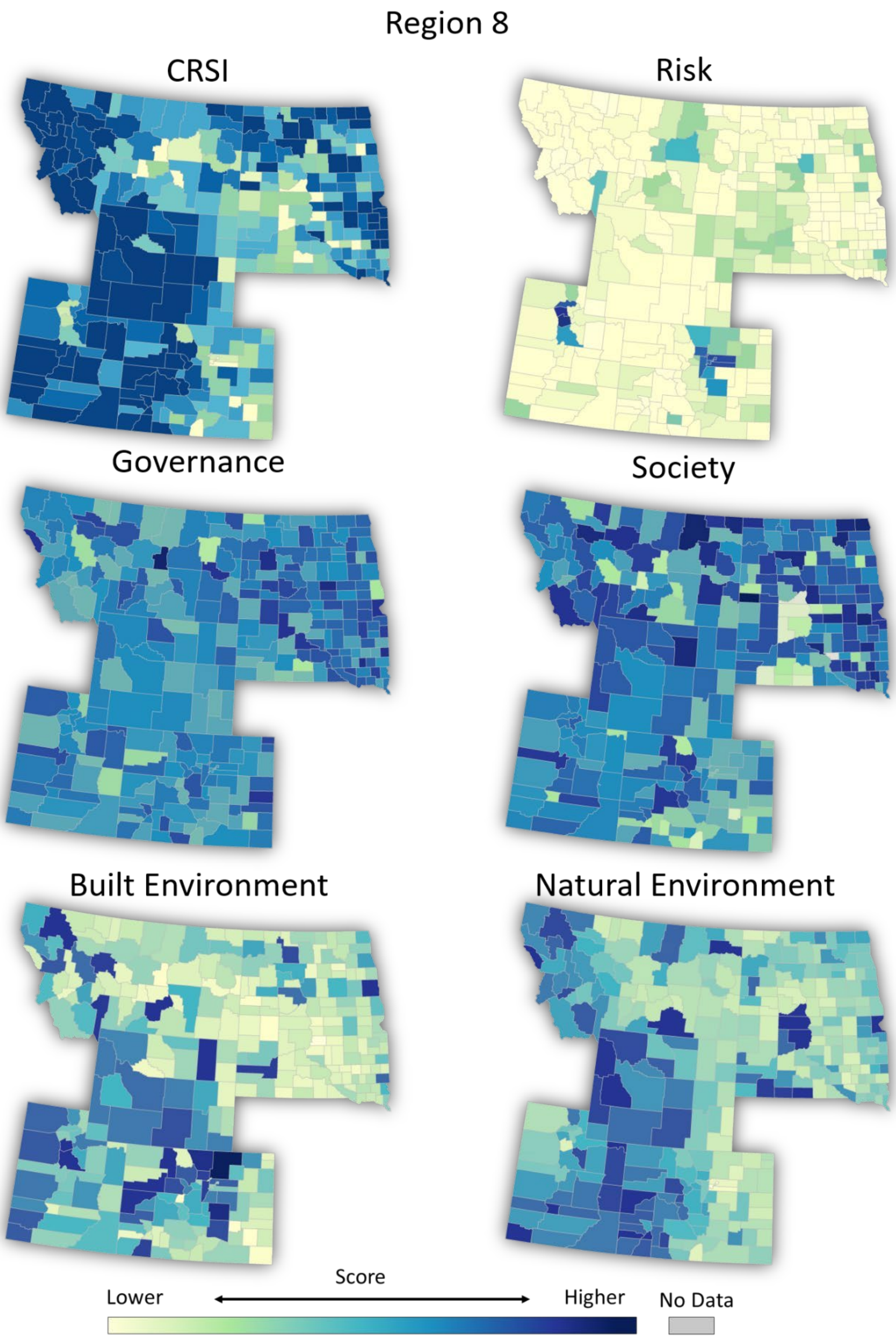


Figure 4.44 The distributions of EPA Region 8 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.9 Twenty-five counties in EPA Region 8 with the highest CRSI values.

Region 8	
Rank	**County**
1.	Roberts, South Dakota
2.	Flathead, Montana
3.	Day, South Dakota
4.	Daniels, Montana
5.	Carbon, Wyoming
6.	Uinta, Wyoming
7.	Deuel, South Dakota
8.	Lincoln, Montana
9.	Ouray, Colorado
10.	Ravalli, Montana
11.	Grant, South Dakota
12.	Pembina, North Dakota
13.	Pitkin, Colorado
14.	Gunnison, Colorado
15.	San Miguel, Colorado
16.	Duchesne, Utah
17.	Ward, North Dakota
18.	Beaverhead, Montana
19.	Garfield, Colorado
20.	Teton, Montana
21.	Granite, Montana
22.	Chaffee, Colorado
23.	McLean, North Dakota
24.	Jefferson, Montana
25.	Hamlin, South Dakota

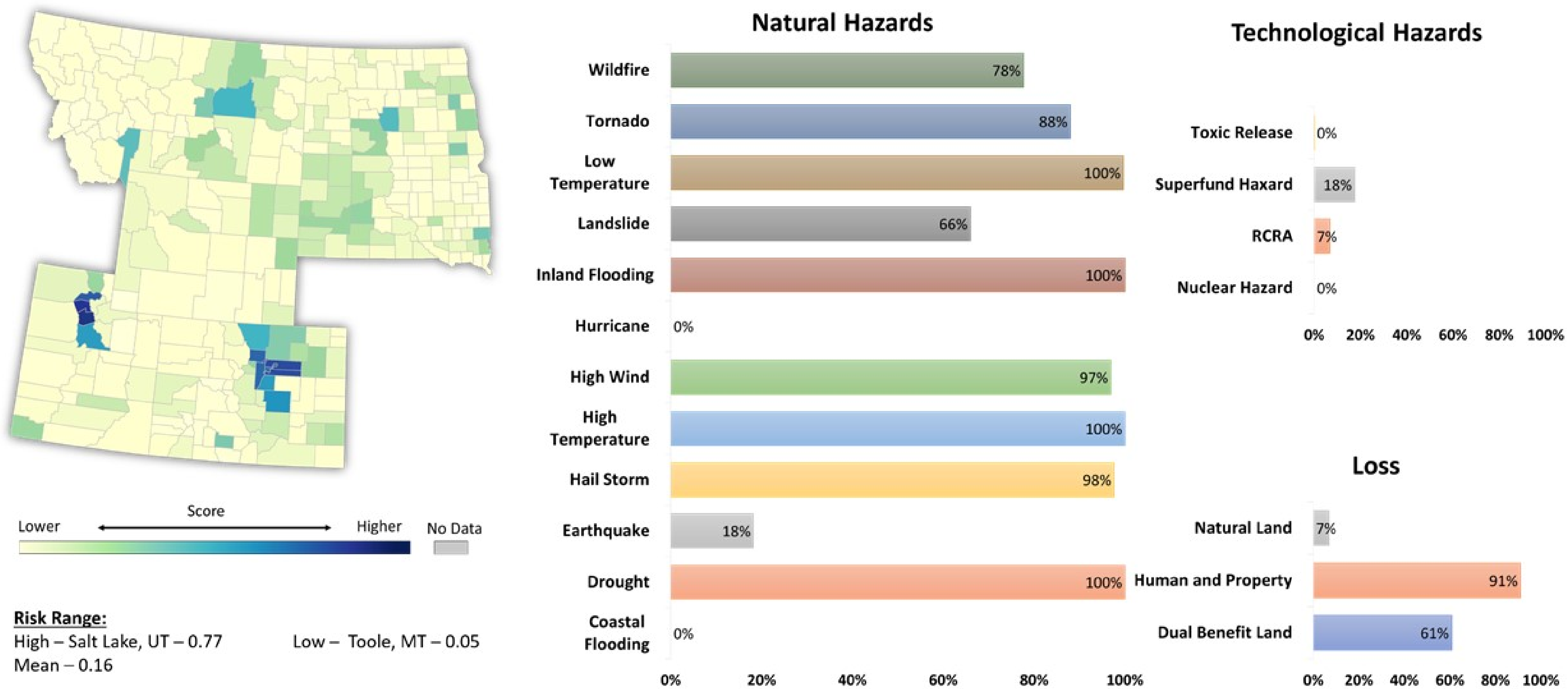


Figure 4.27 Map of Risk Domain scores by county for Region 8; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

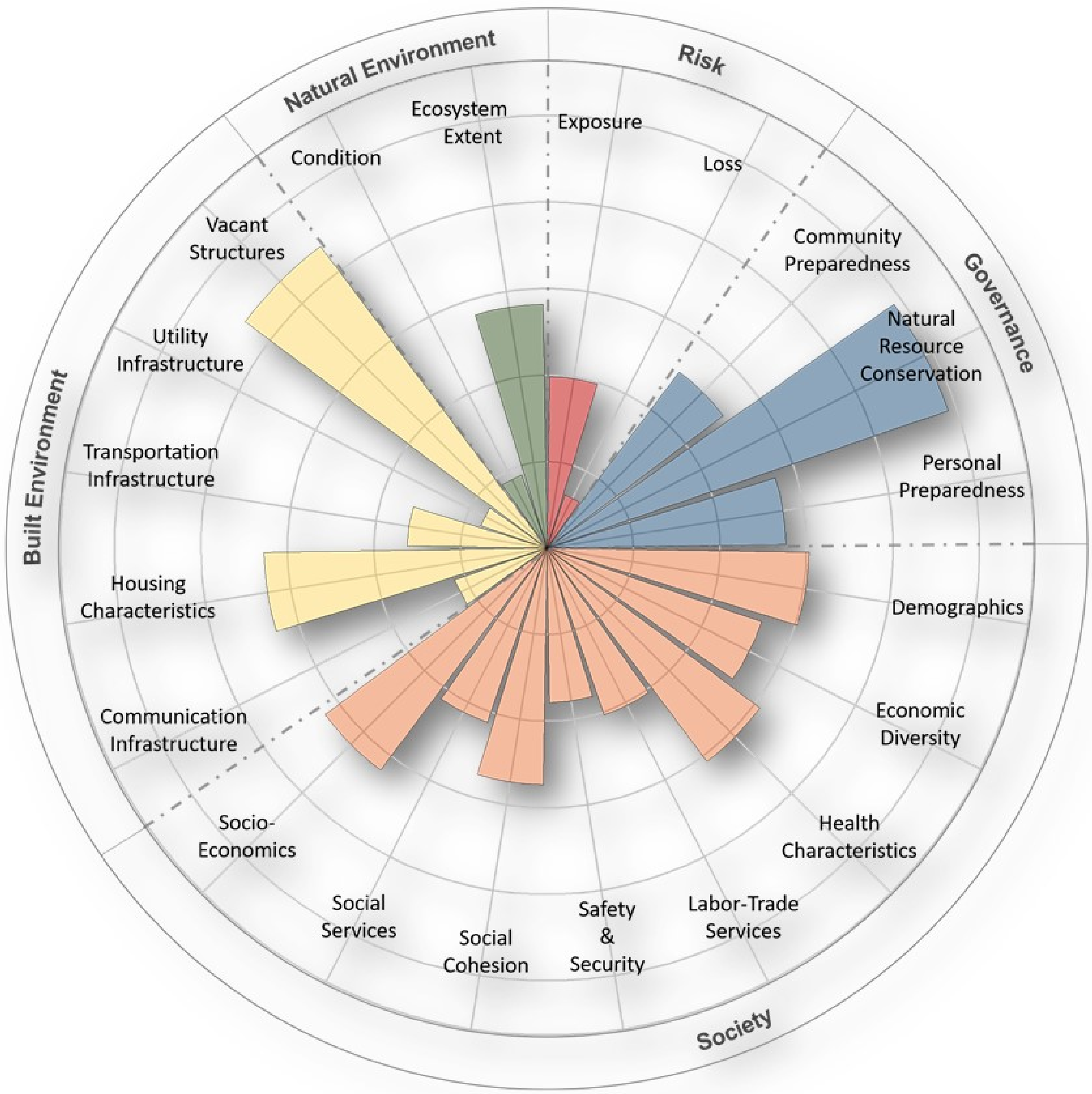


Figure 4.28 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 8. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

EPA Region 9

Region 9 of the EPA includes Arizona, California, Hawaii, and Nevada. Also included in this region are the Pacific Islands (Northern Marianas, Guam, and American Samoa). Region 9 serves 148 federally recognized tribes in Arizona, California, and Nevada. Across the region heat, drought, and insect outbreaks have all led to increased wildfires. In Hawaii, increased ocean temperatures have heightened risks of coral bleaching and disease. Hawaii also faces increased coastal flooding and erosion concerns. In the San Diego Harbor region of California, extreme heat, rising temperatures, severe drought, and extensive wildfire are all projected. Los Angeles, CA has suffered severe drought, issues in water quality and quantity, and infrastructure damage. Earthquakes and tsunamis are additional concerns in regards to resilience in Los Angeles. Oakland, CA is projected to experience problems associated with sea level rise, in addition to the resilience issues it already faces around social inequity, earthquakes, and affordable housing. Across the Bay in San Francisco, CA earthquakes are also a concern, and projections of rising temperatures and severe drought have will increase risk of wildfire. Berkley, CA has experienced extreme heat and warming, extensive wildfires, and additional resilience issues around earthquakes. The EPA Region 9 Climate Change Adaptation Implementation Plan (USEPA-R9 2014) states that regional resilience goals include the promotion of water efficiency, conservation, and recycling. The region also has a Coral Reef Strategy to reduce local pollution and increase coral reef climate change resiliency.

A summary of the overall CRSI domain scores for EPA Region 9 is presented in Figure 4.47. The overall CRSI score (5.524) is above the national average and ranks 4th among the ten EPA Regions. The risk domain score is above the national average and the Governance for natural hazard events domain score is below the national average. The Built Environment domain score is the highest in the nation and the Natural Environment domain score is moderate to high. The spatial distribution of these scores among the counties in EPA Region 9 is shown in Figure 4.48 with some of the higher CRSI values in Hawaii, northern Nevada, northern Arizona and northern California. Table 4.10 shows the counties with the highest CRSI values in Region 9 are in Arizona (9 counties), California and Nevada (6 counties each) and Hawaii (4). The counties with lower CRSI values (<1.5) are in California (2), Nevada (1) and Hawaii (1). Low risk for natural hazard events is shown in Figure 4.48 for much of Arizona and Nevada and all of Hawaii. High Governance domain scores are shown for Hawaii and much of Nevada and Arizona as well as southern California. Higher Built Environment domain scores are seen in southern California, a swath through the middle of Arizona and the Las Vegas region of Nevada.

Risk due to natural hazard events across Region 9 is examined in more detail in Figure 4.49. Natural exposures due to natural hazard events are dominated by wildfires, low and high temperatures, inland flooding, and drought in virtually all counties (>97%). Earthquakes, tornadoes landslides high winds, hail occur in 81-86% of Region 9 counties. RCRA (Resource Conservation and Recovery Act) sites and Superfund sites represent a majority of technological exposure indicator at 58% and 49% of counties, respectively. Nuclear sites also contribute a sizeable portion of risk potential in this region at 12% of counties. Most exposure comes from natural hazard events, with only 5% resulting from proximity to technological hazards. Risk ranges from a low score of 0.06 in Maui County, HI to 0.76 in Orange County, California; with a regional average (0.23) at about the national at 0.229.

The contributions of the 20 indicators to the domains that comprise CRSI for Region 9 are shown in Figure 4.50. The strongest contributors to the Built Environment score are vacant structure and housing characteristics., Demographic characteristics (Society), exposure to natural hazard events (Risk), and natural resource conservation (Governance) also show strong contributions to domain scores. Secondary contributor indicators scores include health characteristics and economic diversity (Society), as well as ecosystem type extent (Natural Environment). Weak contributions are shown for the following indicators: community preparedness (Governance), safety and security and labor-trade services (Society), and condition of ecosystems (Natural Environment).

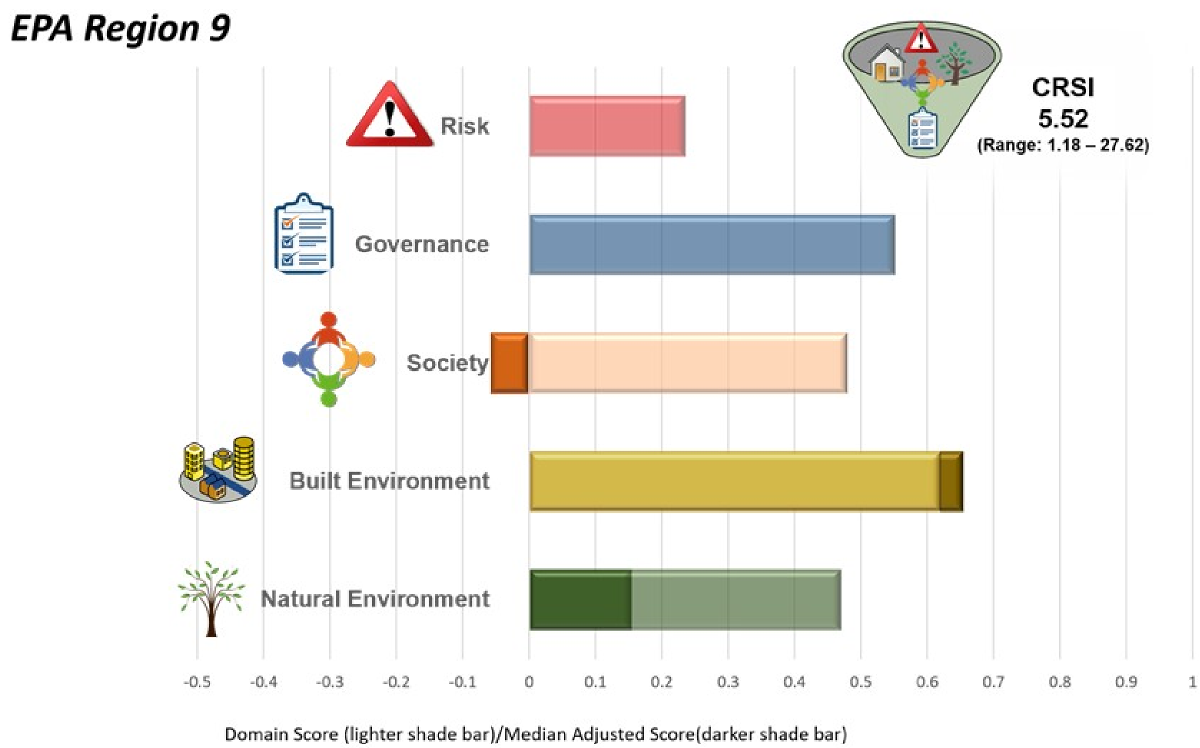


Figure 4.29 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 9, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

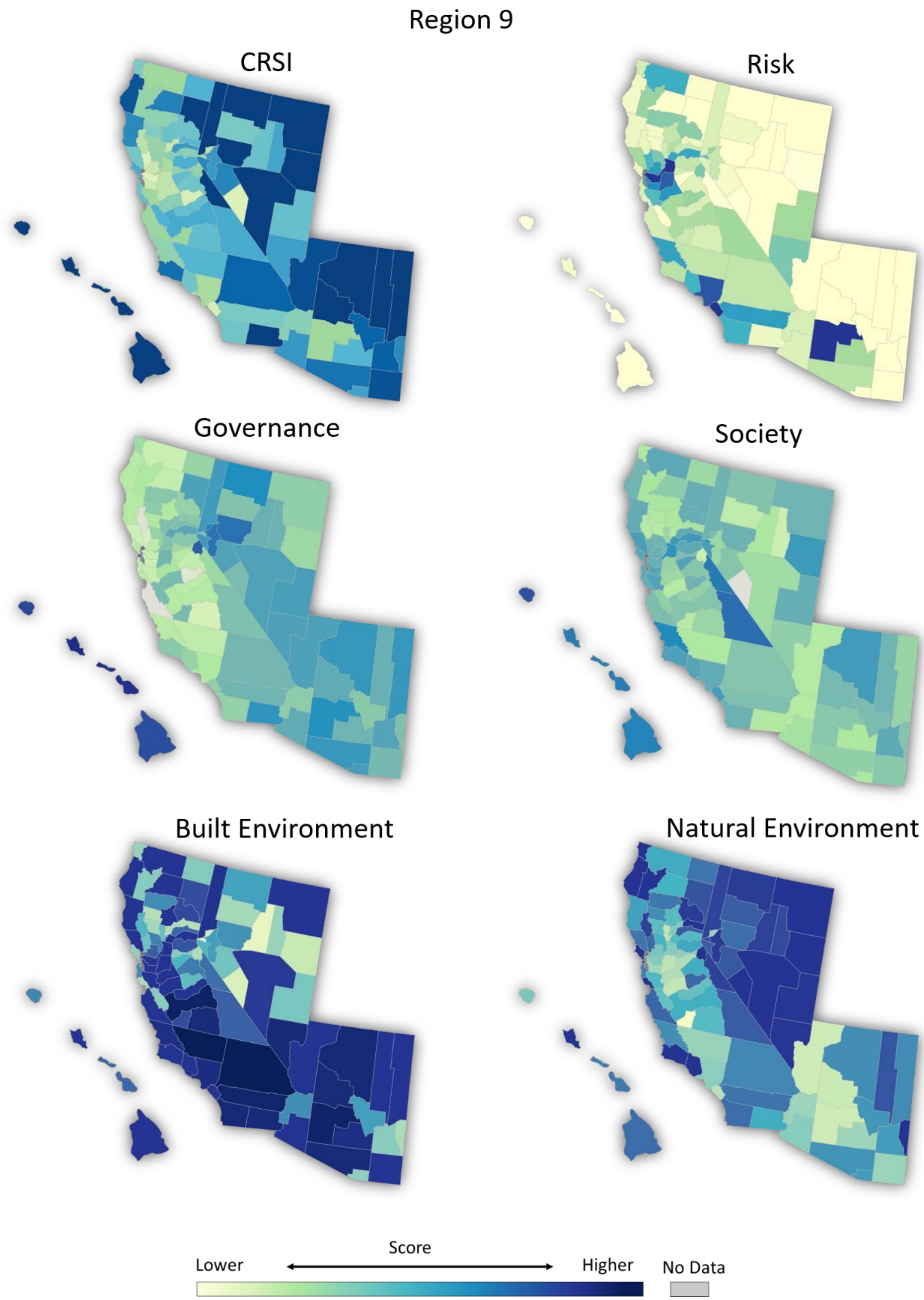


Figure 4.48 The distributions of EPA Region 9 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.10 Twenty-five counties in EPA Region 9 with the highest CRSI values.

Region 9	
Rank	County
1.	**Maui, Hawaii**
2.	Kauai, Hawaii
3.	Hawaii, Hawaii
4.	Honolulu, Hawaii
5.	Coconino, Arizona
6.	Mono, California
7.	Navajo, Arizona
8.	Lassen, California
9.	Churchill, Nevada
10.	White Pine, Nevada
11.	Humboldt, Nevada
12.	Apache, Arizona
13.	Nye, Nevada
14.	Yavapai, Arizona
15.	Elko, Nevada
16.	Imperial, California
17.	Washoe, Nevada
18.	Mohave, Arizona
19.	Cochise, Arizona
20.	Humboldt, California
21.	Graham, Arizona
22.	Gila, Arizona
23.	San Bernardino, California
24.	Santa Barbara, California
25.	Pima, Arizona

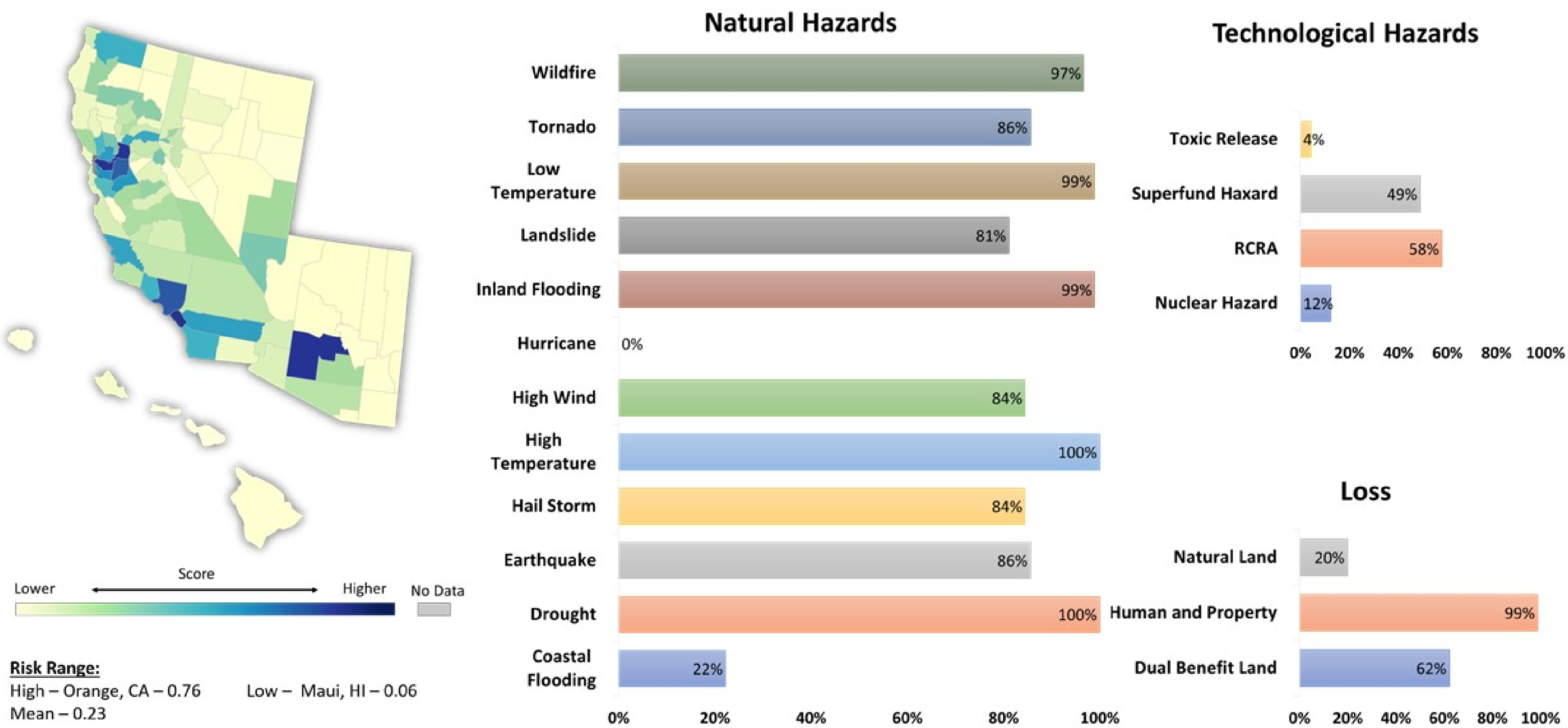


Figure 4.30 Map of Risk Domain scores by county for Region 9; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region.

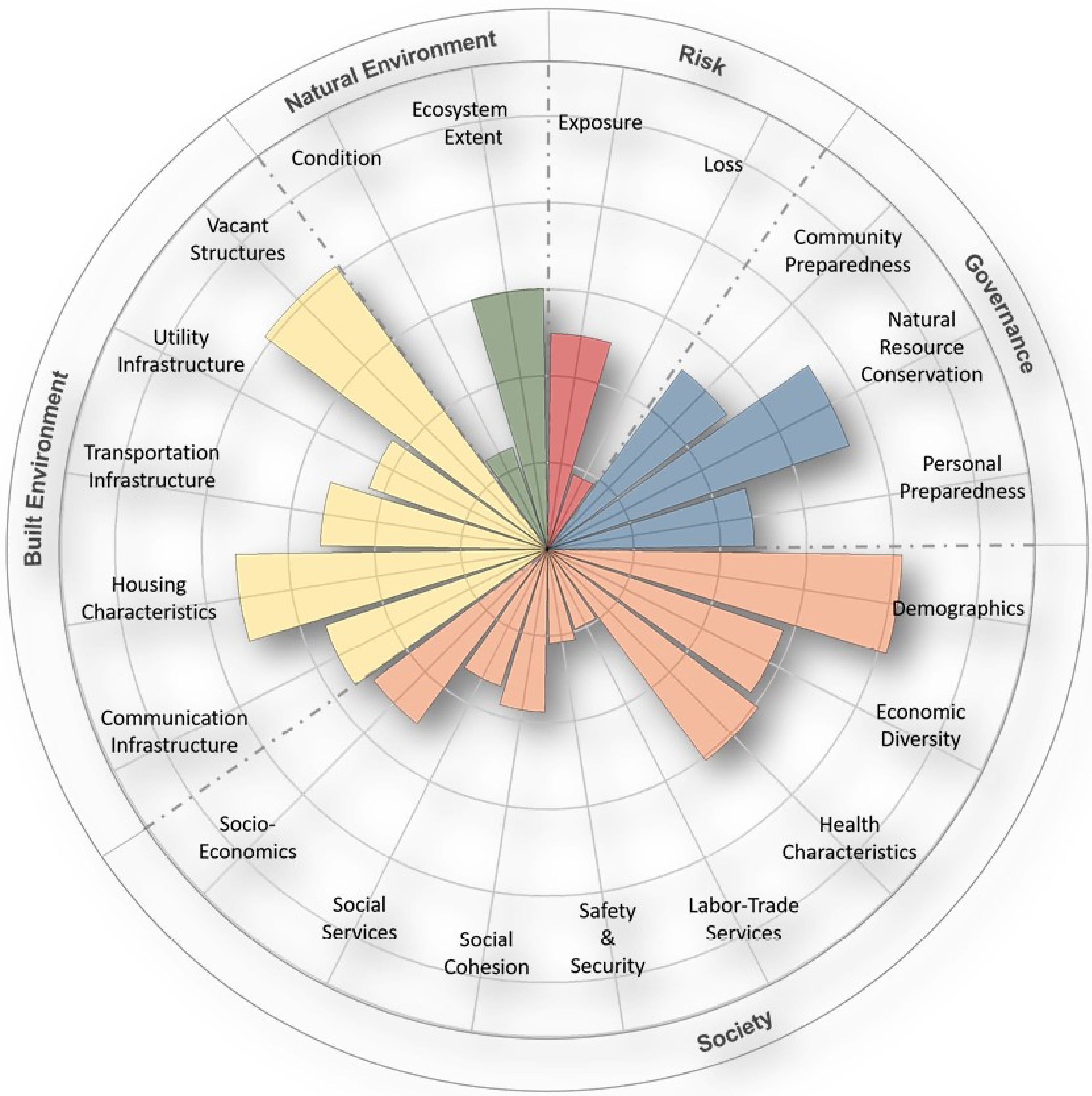


Figure 4.31 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 9. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

EPA Region 10

Region 10 of the EPA includes Alaska, Idaho, Oregon, and Washington. EPA Region 10 office serves 271 federally recognized tribes in Alaska, Idaho, Oregon, and Washington. Regional threats include increasing ocean acidity, sea level rise, erosion, inundation, infrastructure risks. The combination of insect outbreaks, tree disease and wildfire are resulting in widespread tree die-offs across Region 10. Alaska has experienced significant temperature rises, increasing at double the speed of the rest of the United States, causing glaciers to shrink and sea ice to recede. The permafrost is thawing, leading to more wildfires. Eugene, OR has experienced severe drought and extensive wildfire. Changing ocean temperatures have allowed for more invasive species and diminishing cold water species. Beaverton, OR is projected to experience temperature rises, severe drought, extensive wildfires, extreme rainfall, flooding, and issues in water quality and quantity. King County, WA has been impacted by extreme heat, extreme rainfall, flooding, erosion, infrastructure damage and sea level rise. According to the EPA Region 10 Climate Change Adaptation Implementation Plan (USEPA-R10), regional actions to improve resilience include using Water Sense to encourage water efficiency, including ocean acidification language in NEPA review comments, and incorporating green infrastructure as part of settlement agreements.

A summary of the overall CSRI score and the domain scores for EPA Region 10 is shown in Figure 4.51. The overall CRSI score of 15.395 – is the highest in the nation. The Risk domain score is below the national averages. The Society domain score is similar to national average and the Governance, Built Environment and Natural Environment domain scores are well above the national average. The spatial distribution of the overall CRSI score and the domain scores among the counties of EPA Region 10 are shown in Figure 4.52. Table 4.11 shows the higher CRSI values occur in Alaska (10 boroughs) and Idaho (5 counties). The lower CRSI values (< 1.50) occur in Washington (1 county) and Idaho (1). Overall risk for natural hazard events appears moderate through the region while the Governance for natural hazard events scores are lower in southern Oregon.

Risk due to natural hazard events across Region 10 is examined in more detail in Figure 4.53. Natural exposures due to natural hazard events are dominated by high and low temperatures, inland flooding and drought (>95% of counties). Wildfires (83% of counties in Region 10), high winds (80%), hail (70%), landslides (67%) and earthquakes (46%) are the remaining dominant natural hazard influences in Region 10. Superfund sites and RCRA (Resource Conservation and Recovery Act) sites represent the majority of the technological exposure indicator at 65% and 27%, respectively. RCRA and nuclear sites contribute a negligible portion of risk potential in this region at 32% and 18% of counties, respectively. Most exposure comes from natural hazard events, with only 2% resulting from proximity to technological hazards. Risk ranges from the lowest score in the nation at 0.010 in Kodiak Island Borough, Alaska to 0.57 in Pierce County, Washington, with a regional average well below the national at 2.42.

The contributions of the twenty indicators to the domain scores that comprise CRSI are shown in Figure 4.54 for EPA Region 10. The strongest contributor to the Built Environment domain score is vacant structures, natural resource conservation indicator scores (Governance) and lower exposure and loss risk scores (Risk) are also strong contributors. Secondary contributions are shown for the following indicators: housing characteristics (Built Environment); demographic characteristics, health characteristics and economic diversity (Society); and extent of ecosystems (Natural Environment). The weakest contribution scores are for safety and security (Society), utility infrastructure (Built Environment) and ecosystem condition (Natural Environment).

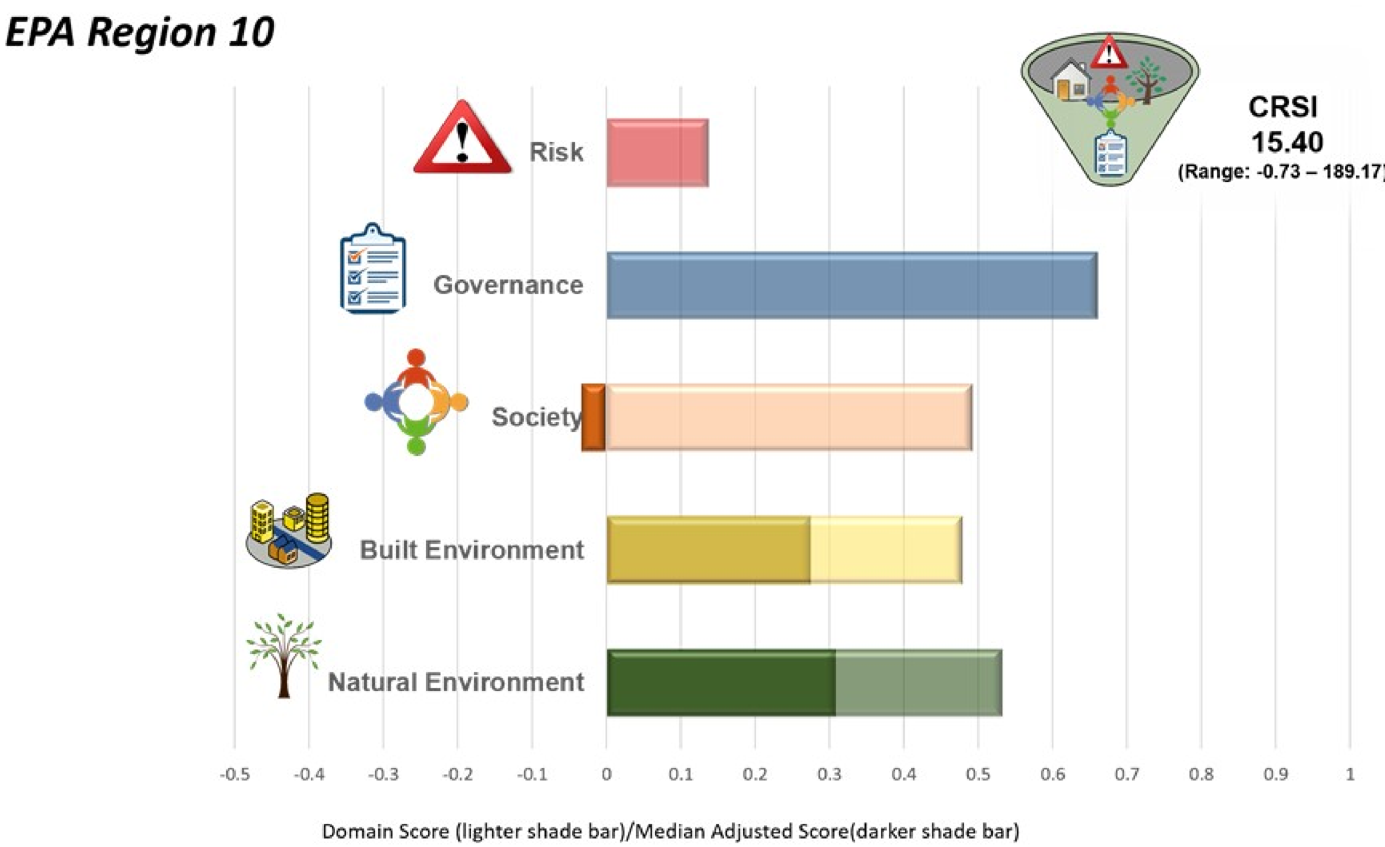


Figure 4.32 Summary of CRSI (upper right hand value) and domain scores (light colored bars) for EPA Region 10, along with domain median adjusted scores showing influence of each domain on final CRSI score (dark colored bars).

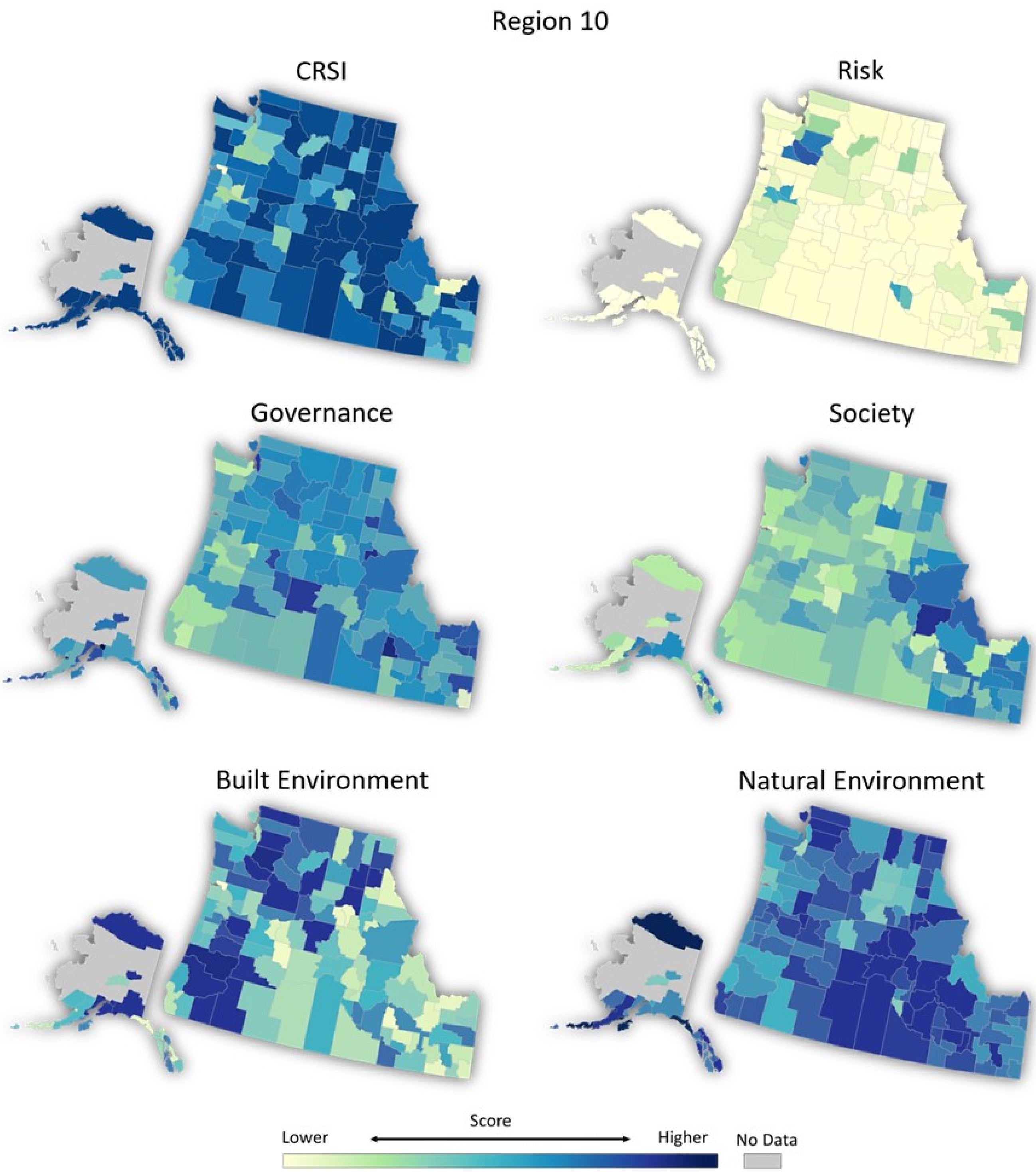


Figure 4.33 The distributions of EPA Region 10 CRSI values and domain scores (Risk, Governance, Society, Built Environment and Natural Environment).

Table 4.11 Twenty-five counties in EPA Region 10 with the highest CRSI values.

Region 10	
Rank	**County**
1.	Kodiak Island, Alaska
2.	Juneau City and, Alaska
3.	Ketchikan Gateway, Alaska
4.	Aleutians East, Alaska
5.	Hoonah-Angoon, Alaska
6.	Haines, Alaska
7.	Prince of Wales-Hyder, Alaska
8.	North Slope, Alaska
9.	Sitka City and, Alaska
10.	Dillingham, Alaska
11.	Petersburg, Alaska
12.	Bristol Bay, Alaska
13.	Kenai Peninsula, Alaska
14.	Wrangell City and, Alaska
15.	Fairbanks North Star, Alaska
16.	Skagway Municipality, Alaska
17.	Aleutians West, Alaska
18.	Yakutat City and, Alaska
19.	Anchorage Municipality, Alaska
20.	Latah, Idaho
21.	Lake and Peninsula, Alaska
22.	Bonner, Idaho
23.	Valley, Idaho
24.	Boundary, Idaho
25.	Benewah, Idaho

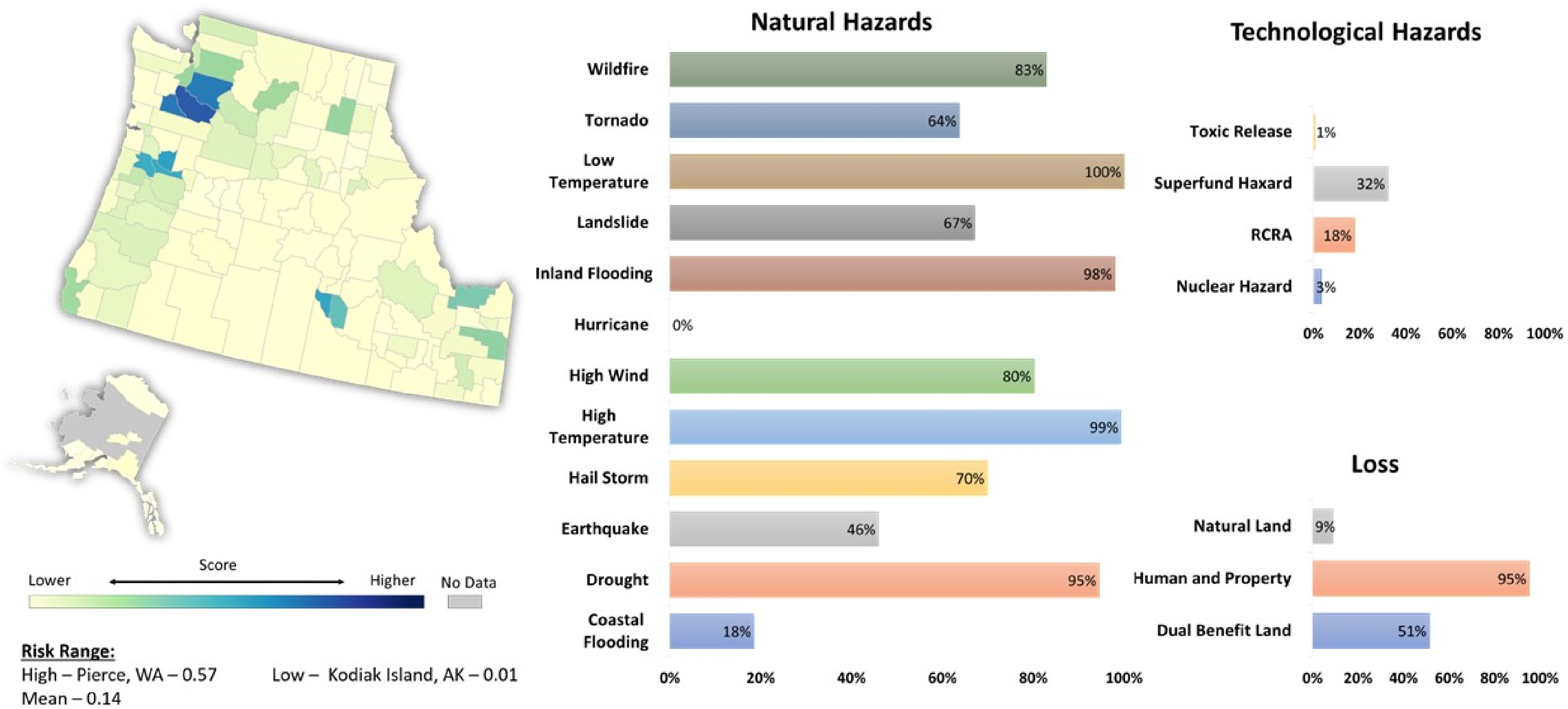


Figure 4.34 Map of Risk Domain scores by county for Region 10; proportion of natural exposures by natural hazard event type, technological exposures, losses and exposure type nationwide; and the range of risk with the highest risk and lowest risk counties identified; as well as, the three primary exposure types in the region

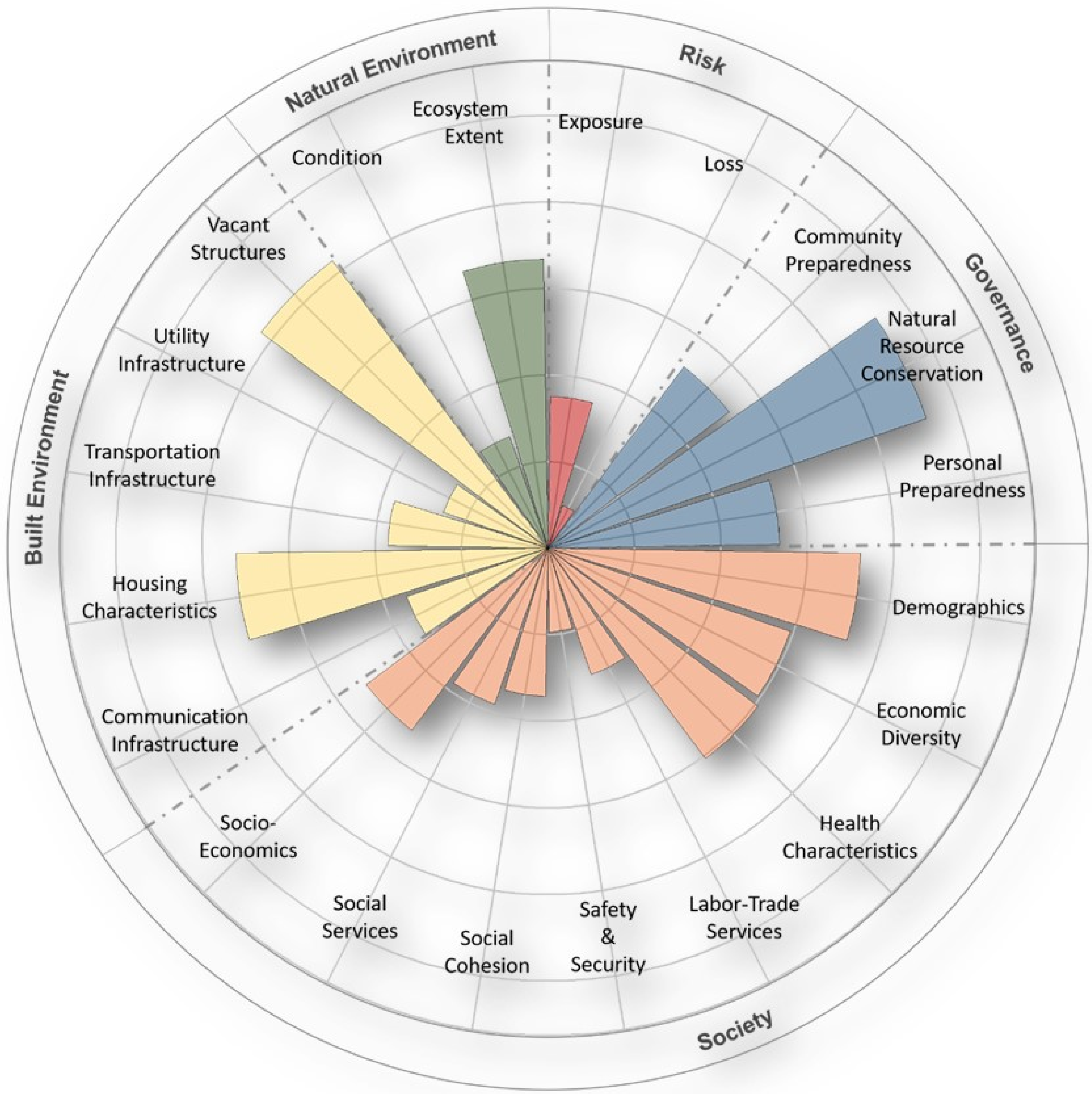


Figure 4.35 Polar plot showing the contribution of the 20 indicators associated with the domain scores for the EPA Region 10. The length of the bars corresponds to the indicator score. Within a domain, the higher indicator scores show a greater contribution to the domain score (sum of indicator scores).

7. Future Directions for Community Resilience to Extreme Weather Events

Every year, U.S. counties and communities face devastating losses caused by weather-related disasters. Fires, floods, storms, other hazards and their associated consequences have significant impacts on counties and communities, the economy, infrastructure and the environment. The U.S. has recently experienced several large scale and devastating natural hazard events, including catastrophic wildfires, far reaching floods, and damaging storms. Such events can have personal, social, economic and environmental impacts that take many years to dissipate. The increasing prominence of extreme weather events makes it critical for governments, businesses and individuals to examine their anticipatory adaptation and organizational resilience to these events (Linnenluecke et al. 2012). The private sector and all levels of government are embracing resilience as a holistic, proactive framework to reduce risk, improve services, adapt to changing conditions, and empower citizens (e.g., National Disaster Resilience Competition; HUD 2017; Leadership in Community Resilience; NLC 2016, 2017).

The U.S. has and continues to cope well with natural hazard events, through established and cooperative emergency management arrangements, effective capabilities, and dedicated professional and volunteer personnel. Americans are also renowned for their resilience to hardship, including the ability to innovate and adapt, a strong community spirit that supports those in need and the self-reliance to withstand and recover from disasters. A collective responsibility for resilience is needed to effectively build capacities at multiple scales.

Our desire to have counties and communities that are minimally impacted by natural hazard events is nearly impossible without a strong recoverability plan and its execution following an event. These plans and their execution maintain a community at a significant distance from ecological, economic and social tipping points (e.g., stability, sustainability, joblessness, social inequity, ecosystem condition). Little attention has been given to the interconnectedness of the aspects of resilience (Summers et al. 2014) as they relate to a community's natural hazard resilience. A community may be naturally vulnerable to natural hazard events or vulnerable through anthropogenic activities but its resilience to these vulnerabilities is guided by the combination of environmental, social, economic and governance drivers.

Given the increasing regularity and severity of natural hazard events, U.S. national, state and local governments have recognized that an integrated, coordinated and cooperative effort is required to enhance their capacities to withstand and recover from weather-related emergencies and disasters. A disaster resilient community is one that works together to understand and manage the risks that it confronts. Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. If all these sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector.

Potential role of governments

Governments, at all levels, have a significant role in strengthening the nation's resilience to disasters:

- Developing and implementing effective, risk-based land management and planning arrangements and other mitigation activities;
- Having effective arrangements in place to inform people about how to assess risks and reduce their exposure and vulnerability to hazards;
- Having clear and effective education systems so people understand what options are available and what the best course of action is in responding to a hazard as it approaches;
- Supporting individuals and counties and communities to prepare for extreme events;
- Ensuring the most effective, well-coordinated response from our emergency services and volunteers when disaster hits; and
- Working in a swift, compassionate and pragmatic way to help counties and communities recover from devastation and to learn, innovate and adapt in the aftermath of disastrous events.

Local, state and national governments are working collectively to incorporate the principle of disaster resilience into aspects of natural hazard arrangements, including preventing, preparing, responding to, and recovering from, disasters. Further future enhancements and local applications of CRSI can provide advancements in these disaster-related resilience activities.

The Federal Emergency Management Agency (FEMA) established the Strategic Foresight Initiative (SFI; FEMA 2012) to address this need. This initiative has brought together a wide cross-section of the emergency management community to explore key future issues, trends and other factors, and to work through their implications. Working collaboratively and with urgency, we are beginning to understand the full range of changes we could encounter and the nature of our future needs; and we can begin to execute a shared agenda for action. One of the first tasks of this initiative group should be to bring together the representative views of all governments, business, non-government sector and the community into a comprehensive National Disaster Resilience Strategy. This group should also be tasked with considering further those lessons arising from the recent bushfires, floods, tornadoes and super-storms that could benefit from national collaboration.

Role of business

Businesses can and do play a fundamental role in supporting a community's resilience to disasters. They provide resources, expertise and many essential services on which the community depends. Businesses, including critical infrastructure providers, make a contribution by understanding the risks that they face and ensuring that they are able to continue providing services during or soon after a disaster.

Role of individuals

Disaster resilience is based on individuals taking their share of responsibility for preventing, preparing for, responding to and recovering from disasters. They can do this by drawing on guidance, resources and policies of government and other sources such as community organizations. The disaster resilience of people and households is significantly increased by active planning and preparation for protecting life and property, based on an awareness of the threats relevant to their locality. It is also increased by knowing and being involved in local community disaster or emergency management arrangements, and for many being involved as a volunteer.

Role of non-government organizations and volunteers

Non-government and community organizations are at the forefront of strengthening disaster resilience in the United States. It is to them that Americans often turn for support or advice and the dedicated work of these agencies and organizations is critical to helping counties and communities to cope with, and recover from, a disaster. Building and fostering partnerships between U.S. national, state and local governments and these agencies and organizations is essential to spreading the disaster resilience message and to finding practical ways to strengthen disaster resilience in the counties and communities they serve. Strengthening the U.S.'s disaster resilience is not a stand-alone activity that can be achieved in a set timeframe, nor can it be achieved without a joint commitment and concerted effort by all sectors of society. But it is an effort that is worth making, because building a more disaster resilient nation is an investment in our future.

Potential Utility of CRSI

This report has outlined the approach and application of an index to examine the resilience of U.S. counties, EPA Regions and the nations to extreme-weather events. Further research and application efforts to adapt CRSI for use for individual counties and communities would clearly be useful for the development of community-specific resilience plans. The potential of using CRSI-related information by EPA regional staff tasked with assessing resilience in their areas of the counties seems particularly useful. Allowing EPA regions to see in one application the specifics of risk, governance, societal attributes, built environment information and natural environment information will be important in further development local and county-level resilience plans. Similarly, at the county level, EPA can:

(1) Assess relative risks of differing weather-related events
(2) Disassemble CRSI to determine why the resilience of certain counties are projected to be low and others are projected to be high
(3) Provide lessons learned from one county to the next on governance and other activities that have increased local resilience to weather-related events
(4) Provide a comparative database permitting one way to assess where investments might have the greatest return in terms of improved resilience
(5) Provide a database that can be updated to include the most recent information on the CRSI metrics, indicators and domains so that improvements can be tracked.

8. References

Abdrabo, M. and Hassaan, M. (2014). Assessing resilience of the Nile Delta urban centers to sea level rise impacts. 5th Global Forum on Urban Resilience and Adaptation, Bonn, Germany.

Adger, W.N. (2001). Scales of governance and environmental justice for adaptation and mitigation of climate change. *Journal of International Development* 13:921-931.

Adger, W.N., Arnell, N.W. and Tompkins, E.L. (2005a). Successful adaptation to climate change across scales. *Global Environmental Change* 15:77–86.

Adger, W.N., Hughes, T.P., Folke, C., Carpenter, S.R., Rockstrom, J. (2005b). Social-ecological resilience to coastal disasters, *Science* 309: 1036-1039.

Adger, W.N. (2010). Social capital, collective action, and adaptation to climate change. Der Klimawandel. VS Verlag für Sozialwissenschaften, pp. 327-345.

Ainuddin, S. and Routray, J.K. (2012). Earthquake hazards and community resilience in Baluchistan. *Natural Hazards* 63(2):909-937.

Alessa, L., Kliskey, A., Lammers, R., Arp, C., White, D., Hinzman, L. and Busey, R. (2008). The arctic water resource vulnerability index: an integrated assessment tool for community resilience and vulnerability with respect to freshwater. *Environmental Management* 42(3):523-541.

Alexander, D. (2016). Disaster and Emergency Preparedness, Response and Recovery. In: Oxford Research Encyclopedia, Natural Hazard Science (naturalhazardscience.oxford.com); 10.1093/acrefore/9780199389407.013.12

Alongi, D.M. (2008) Mangrove forests: Resilience, protection from tsunamis, and responses to global climate change. *Estuarine, Coastal and Shelf Science* 76: 1-13.

ARUP. (2014). City Resilience Framework. The Rockefeller Foundation, ARUP Development International.

Baker, A. (2009). Creating an empirically derived community resilience index of the Gulf of Mexico region. Master of Science Thesis in Department of Environmental Sciences, Louisiana State University, Baton Rouge, LA.

Balbus, J.M., Malina, C. (2009) Identifying vulnerable subpopulations for climate change health effects in the United States. *Journal of Occupational and Environmental Medicine* 51: 33-37.

Baldwin, C., King, R. (2018) Social sustainability, climate resilience and community-based urban development. (p.198). London: Routledge.

Balica, S.F. (2012). Applying the flood vulnerability index as a knowledge base for flood risk assessments. Ph.D. Thesis, Delft University of Technology, Delft, The Netherlands.

Batica, J. (2015). Methodology for flood resilience assessment in urban environments and mitigation strategy development. Ph.D. Thesis, Universite Nice Sophia Antipolis, Nice, France.

Baum, L.E., T. Petrie, G. Soules and N. Weiss. 1970. A maximization technique occurring in the statistical analysis of probabilistic functions of Markov chains. *The Annals of Mathematical Statistics* 41: 164-171.

Berkes, F. and Ross, H. (2013). Community resilience: toward an integrated approach. *Society and Natural Resources* 26(1):5-20.

Burton, C. G. (2015). A Validation of Metrics for Community Resilience to Natural Hazards and Disasters Using the Recovery from Hurricane Katrina as a Case Study. *Annals of the Association of American Geographers* 105(1):67-86.

Buck, K.D., J.K. Summers, L.C. Harwell, L.M. Smith and S.F. Hafner. 2017. Development of a MultiHazard Landscape for Exposure and Risk Interpretation: The PRISM Approach. *International Journal of Disaster Risk Management*. In Review (draft available from lead author).

Cai, Y.P., Huang, G.H., Tan, Q., Chen, B. (2011) Identification of optimal strategies for improving ecoresilience to floods in ecologically vulnerable regions of a wetland. *Ecological Modelling* 222:360-369.

Cassidy, L. and Barnes, G.D. (2012). Understanding household connectivity and resilience in marginal rural communities through social network analysis in the village of Habu, Botswana. *Ecology and Society* 17(4):11.

Chandra, A, J. Acosta, S. Howard, L. Uscher-Pines, M. Williams, D. Yeung, J. Garnett and Meredith, L. (2011). Building community resilience to disasters. *Rand Health Quarterly* 1:6.

Christopher, M., Peck, H. (2004) Building the resilient supply chain. *International Journal of Logistics Management* 15:1-13.

Ciani, F. (2012). A resilience-based approach to food insecurity: the impact of Mitch Hurricane on rural households in Nicaragua. University of Florence, Department of economics, PhD programme in development economics.

Cutter, S.L. (1996). Societal responses to environmental hazards. *International Social Science Journal* 48(150):525-536.

Cutter, S.L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., Webb, J. (2008) A place-based model for understanding community resilience to natural disasters. *Global Environmental Change* 18: 596-606.

Cutter, S. L., Boruff, B. J. and Shirley, W.L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly* 84(2):242-261.

Cutter, S. L., Burton, C. G. and Emrich, C.T. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management* 7(1):1-22.

Cutter, S. L., Ash, K. D., and Emrich, C.T. (2014). The geographies of community disaster resilience. *Global Environmental Change* (29):65-77.

Daniell, J. E., Daniell, K. A., Daniell T. M. and Khazai, B. (2010). A country level physical and community risk index in the Asia-Pacific region for earthquakes and floods. Karlsruhe Institute of Technology, Karlsruhe. Germany.

Dominelli, N. (2013) Mind the gap: Built infrastructures, sustainable caring relations, and resilient communities in extreme weather events. *Australian Social Work* 66: 204-217.

Eason, T., Garmestani, A.S., Stow, C.A., Rojo, C., Alvarez-Cobelas M. and Cabezas, H. (2016). Managing for resilience: an information theory-based approach to assessing ecosystems. *Journal of Applied Ecology* 53: 656-665.

Ebi, K.L. (2011) Resilience to the health risks of extreme weather events in a changing climate in the United States. *International Journal of Environmental Research and Public Health* 8: 4582-4595.

Esnard, A.M., Sapat A. and Mitsova, D. (2011). An index of relative displacement risk to hurricanes. *Natural Hazards* 59:833-859.

Esty, D.C., Levy, M., Srebotnjak, T. and De Sherbinin, A. (2005). Environmental sustainability index: Benchmarking national environmental stewardship. New Haven: Yale Center for Environmental Law and Policy, pp. 47-60.

FDEM (Florida Department of Emergency Management). (2016). 2016 State of Florida Comprehensive Emergency Management Plan. http://www.floridadisaster.org/cemp.htm

FEMA (Federal Emergency Management Agency). (2011). A whole community approach to emergency management: Principles, themes, and pathways for action. Department of Homeland Security, FDOC 104-008-1, December 2011.

FEMA (Federal Emergency Management Agency). (2012). Crisis Response and Disaster Resilience 2030: Forging Strategic Action in an Age of Uncertainty.

FEMA (Federal Emergency Management Agency). (2017). Draft Interagency Concept for Community Resilience Indicators and National-Level Measures.

Flanagan, B.E. E.W. Gregory, E.J. Hallisey. J.L. Heitgard Lewis, B. (2011). A social vulnerability index for disaster management. *Journal of Homeland Security and Emergency Management* 8:3.

Foley, J.A., DeFries, R. Asner, G.P., Barford, C., Bonan. G., Carpenter, S.R. (2005) Global consequences of land use. *Science* 15: 18.

Frazier, T. G., Thompson, C. M. and Dezzani, R.J. (2014). A framework for the development of the SERV model: A Spatially Explicit Resilience-Vulnerability model. *Applied Geography* 51:158-172.

Garmestani, A.S. and Allen, C.R. (2014). Social-Ecological Resilience and Law. New York: Columbia University Press.

Garmestani, A.S. and Benson, M.H. (2013). A framework for resilience-based governance of socialecological systems. *Ecology and Society* 18(1).

GAO (Government Accountability Office). (2017). High-Risk Series: An Update. Report to Congressional Committees. Government Printing Office, GAO-17-317.

Gunderson, L. (2010). Ecological and human community resilience in response to natural disasters. *Ecology and Society* 15(2):18.

Handmer, J. et al. (2012). Changes in impacts of climate extremes: human systems and ecosystems. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Cambridge University Press. Cambridge, UK and New York, NY USA.

Helms, M. (2016). Detroit reaches blight milestone: 10,000 demolitions. Detroit Free Press, July 19, 2016.

Henstra, D. (2012) Toward the climate-resilient city: Extreme weather and urban climate adaptation policies in two Canadian provinces. *Journal of Comparative Policy Analysis: Research and Practice* 14:175-194.

Holling, C. S. (1986). The resilience of terrestrial ecosystems: local surprise and global change. W.C. Clark and R.E. Munn (eds.) Sustainable Development of the Biosphere. pp. 292-317. New York: John Wiley and Sons.

Hsu, A. et al. (2016). 2016 Environmental Performance Index. New Haven, CT: Yale University.

HUD (Housing and Urban Development). (2017). National Disaster Resilience Competition.

IPCC (Intergovernmental Panel on Climate Change). (2012). Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

Joerin, J. and Shaw, R. (2011). Climate and disaster resilience in cities. *Community, Environment and Disaster Risk Management* 6:47-61.

Kafle, S.K. (2012). Measuring disaster-resilient communities: A case study of coastal communities in Indonesia. *Journal of Business Continuity and Emergency Planning* 5:316-326.

Kailes J.I. and A. Enders. (2007). Moving beyond "special needs": a function-based framework for emergency management and planning. *Journal of Disability Policy Studies* (17):230-7.

Keim M.E. (2008) Building human resilience: the role of public health preparedness and response as an adaptation to climate change. *American Journal of Preventive Medicine* 35: 508-516.

Kellert, S., Mehta, J., Ebbin, S., and Litchtenfeld, L. (2000). Community natural resource management: promise, rhetoric, and reality. *Society and Natural Resources* 13:705-715.

Kirrane, C, Sharkey, C., Naess, L.O. (2013) Shaping strategies: Factors and actors in climate change adaptation. In A. Carrapatoso & E. Kurzinger (Eds*.). Climate-resilient development: Participatory solutions from developing countries* (pp. 43-59). London: Routledge.

Klein, R.J.T., Nicholls, R.J., Thomalla, F. (2003 Resilience to natural hazards: How useful is this concept? EVA Working Paper No. 9, DINAS-COAST Working Paper No. 14Potsdam Institute for Climate Impact Research, Potsdam, Germany. http://temis.documentation.developmentdurable.gouv.fr/docs/Temis/0075/Temis-0075362/20080.pdfww

Kuenzer, C, Renaud, F.G. (2012) Climate and environmental change in river deltas globally: Expected impacts, resilience , and adaptation In F.G. Renaud and C. Kuenzer (eds.), The Mekong Delta System: Interdisciplinary 7 Analyses of a River Delta, pp. 7-46. Springer Science and Business Media: Dordrecht.

Kusumastuti, R., Husodo, Z.A., Suardi L. and Danarsari, D.N. (2014). Developing a resilience index towards natural disasters in Indonesia. *International Journal of Disaster Risk Reduction* 10:327-340.

Lam, N., Reams, M., Li, K., Li, C. and Mata, L. (2016). Measuring Community Resilience to Coastal Hazards along the Northern Gulf of Mexico. *Natural Hazards Review* 17(1).

Li, C. (2013). Community Resilience to Coastal Hazards: An Analysis of Two Geographical Scales in Louisiana. Master of Science Thesis, Louisiana State University, Baton Rouge, LA.

Li, K. (2011). Temporal Changes of Coastal Community Resilience in the Gulf of Mexico Region. Master of Science, Louisiana State University, Baton Rouge, LA.

Linnenluecke, M.K., Griffiths, A. and Winn, W. (2012). Extreme weather events and the critical importance of anticipatory adaptation and organizational resilience in responding to impacts. *Business Strategy and the Environment* 21:17-32.

Ma,S., Chen, B., Wang, Z. (2018) Resilience enhancement strategy for distribution systems under extreme weather events. *IEEE Transactions on Smart Grid* 9: 1442-1451.

Magus, K. (2010). Community resilience: An indicator of social sustainability. *Society and Natural Resources* 23(5):401-416.

Martini, B. (2014). Economic, social and environmental resilience: an analysis for the Italians Regions after 2007. University of Rome Tor Vergata, Rome, Italy.

Martins, L., Girao-Silva, R., Jorge, L., Gomes, A., Musumecfi, F., Rak, J. (2017) Interdependence between power grids and communications networks: A resilience perspective. DRCN 2017 – Design of Reliable Communications Networks; 13th International Conference, March 8-10, 2017, Munich, Germany.

Meadows, D.H. (2008). Thinking in Systems. White River Junction, VT: Chelsea Breen Publishing. 218 pp.

Meher, M., Patra, H. and Sethy, K. (2011). Creating an empirically derived community resilience index for disaster prone area: A case study from Orissa. Disaster, Risk and Vulnerability Conference, Mahatma Gandhi University. Meghalaya, India.

Meitzen, K.M., Phillips, J.N., Perkins, T., Manning, A., Julian, J.P. (2018) Catastrophic flood disturbance and a community response to plant resilience in the heart of the Texas Hill Country, *Geomorphology* 305:20-32.

Melillo, J. M., Richmond, T., and Yohe, G.W. (2014). Climate Change Impacts in the 11 United States: The Third National Climate Assessment. U.S. Global Change Research Program, 12.

National Fish, Wildlife and Plants Climate Adaptation Partnership. (2012). National Fish, Wildlife and Plants Climate Adaptation Strategy. Association of Fish and Wildlife agencies, Council on environmental Quality, Great Lakes Indian Fish and Wildlife Commission, national oceanic and atmospheric administration, and U.S. Fish and Wildlife Service. Washington, DC.

NLC (National League of Cities). (2016). Leadership in Community Resilience Program.

NLC (National League of Cities). (2017). Webinar: Leadership in Community Resilience.

NRC (National Research Council). (2012). Disaster resilience: A national imperative. Washington, DC: The National Academies Press.

NRCS (Natural Resources Conservation Service). (2017a). Soil Survey Staff, United States Department of Agriculture. Web Soil Survey.

NRCS (Natural Resources Conservation Service). (2017b). Soil Survey Staff. Database for the United States of America and the Territories, Commonwealths, and Island Nations served by the USDANRCS. United States Department of Agriculture, Natural Resources.

OMB (Office of Management and Budget and Council on Environmental Quality). (2016). Memorandum for Executive Departments and Agencies: Strengthening Climate Adaptation Planning in Fiscal Year 2016 and Beyond. Memorandum M-16-09.

OECD (Organization for Economic Co-operation and Development). (2011). Perspectives on Global Development 2012: Social Cohesion in a Shifting World, OECD Publishing.

Oven K.J., Curtis, S.E., Reaney S., Riva, M., Stewart M.G., Ohlemuller, R. (2012) Climate change and health and social care: Defining future hazard, vulnerability and risk for infrastructure systems supporting older people's health care in England. *Applied Geography* 33: 16-24.

Panteli, M., Mancarella, P. (2017). Modeling and evaluating the resilience of critical electrical power infrastructure to extreme weather events. *IEEE Systems Journal* 11: 1733-1742.

Patel, S.S., M.B. Rogers, R. Amlot and G.J. Rubin. (2017). What do we mean by 'community resilience'? A systematic literature review of how it is defined in the literature. PLOS Currents Disasters 1: doi: 10.1371/currents.dis.db775aff25efc5ac4f0660ad9c9f7db2

Paton, D., Johnston, D. (2001) Disasters and communities: Vulnerability, resilience and preparedness. *Disaster Prevention and Management, An International Journal* 10:270-277.

Peacock, W.G., Brody, S., Seitz, W., Merrell, W., Vedlitz, A., Zahran, S., Harriss, R. and Stickney, R. (2010). Advancing Resilience of Coastal Localities: Developing, Implementing, and Sustaining the Use of Coastal Resilience Indicators: A Final Report. Hazard Reduction and Recovery Center, Texas A & M University, College Station, TX.

Plough, A., J. Fielding, A. Chanda, M. Williams, D. Eisenman, K. Wells, G. Law, S. Fogleman and A. Magana. (2013). Building community disaster resilience: Perspectives from a large urban county Department of Public Health. *American Journal of Public Health* 103:1190-1197.

Pratt, C., Kaly U. and Mitchell J. (2004). Manual: How to use the environment vulnerability index. SOPAC Technical Report 383. 60 pp. United Nations Environmental Programme (UNEP), South Pacific Applied Geoscience Commission (SOPAC).

RAND Corporation. (2017). Community Resilience. https://www.rand.org/topics/communityresilience.html.

Renschler, C. S., Frazier A. E., and Miles, S. (2010). Assessing Community Resilience: A Remote Sensing Approach to Evaluate Post-Disaster Ecosystem Recovery. University of Buffalo, Buffalo, NY.

Sanchez, A.X., Osmund, P. van der Heijden, J. (2017) Resilient policies for wicked problems: Increasing resilience in a complex and uncertain world through information integration. In A.X. Sanchez, K. Hampton and G. London (eds.). *Integrating Information in Built Environments* (pp.36-53). London: Routledge.

Smit, B., Burton, I., Klein, R.T., Wandel, J. (2000) An anatomy of adaptation to climate change and variability. *Climatic Change* 45: 223-251.

Smith, L.M., Case, J.L., Smith, H.M., Harwell, L.C., and Summers, J.K. (2012) Relating ecosystem services to domains of human well-being: Foundation for a U.S. index. *Ecological Indicators* 28:79-90.

Smoyer, K.E. (1998) Putting risk in its place: Methodological considerations for investigating extreme health risk. *Social Science & Medicine* 47: 1809-1824.

Stanners, D., P. Bosch, A. Dom, P. Gabrielsen, D. Gee, J. Martin, L. Rickard and J. Weber. 2007 Frameworks for environmental assessment and indicators at the EEA. pp. 127-144. In: T. Hak, B. Moldan and A. Dahl (eds) Sustainability Indicators: A Scientific Assessment. Scope 67. Washington, D.C., Island Press.

Stenseth, N.C., Mysterud, A. Ottersen, G. Hurrell, J.W., Chan, K. Lima, M. (2002) Ecological effects of climate fluctuations. *Science* 297: 1292-1296.

Strickland-Munro, J.K., Allison, H.E., Moore, S.A. (2010) Using resilience concepts to investigate the impacts of protected area tourism on communities. *Annals of Tourism Research* 37: 499-519.

Summers, J.K., L.C. Harwell, K.D. Buck, L.M. Smith, D.N. Vivian, J.J. Bousquin, J.E. Harvey, S.F. Hafner and M.D. McLaughlin. 2017. Development of a Climate Resilience Screening Index (CRSI): An Assessment of Resilience to Acute Meteorological Events and Selected Natura; Hazards. EPA600/R-17/238. US Environmental protection Agency, Washington, DC. October 2017.

Summers, J. K., Smith, L.M., Case J. L., and Linthurst, R.A. (2012). A review of the elements of human resilience with an emphasis on the contribution of ecosystem services. *Ambio* 41:327-340.

Summers, J.K., Harwell, L.C., and Smith, L.M. (2016). A model for change: An approach for forecasting resilience from service-based decisions. *Ecological Indicators* 69:295-309.

Summers, J.K., Smith, L.M., Harwell, L.C., Case, J.L., Wade, C.M., Straub, K.R. and Smith, H.M. (2014). An index of human well-being for the US: a TRIO approach. *Sustainability* 6(6):3915-3935.

Summers, J.K., Smith, L.M., Harwell L.C. and Buck, K.D. (2017). Conceptualizing Holistic Community Resilience to Climate Events: Foundation for a Cumulative Resilience Screening Index. GeoHealth 1. doi:10.1002/2016GH000047.

Tobin, G. A. (1999). Sustainability and community resilience: The holy grail of hazards planning? *Global Environmental Change Part B: Environmental Hazards* 1(1):13-25.

Tompkins, E.L., Adger, W.N. (2004) Does adaptive management of natural resources enhance resilience to climate change? *Ecology and Society* 9:10. http:/www.ecologyandsociety.org/vol9/iss2/art10/

U.S. Census Bureau. (2012). Household Income Inequality within U.S. Counties: 2006–2010 American Community Survey Briefs; ACSBR/10-18; U.S. Census Bureau: Suitland, MD, USA.

U.S. Census Bureau. (2016). American Community Survey 5-Year Data (2009-2015). Revised February 27, 2017.

USEPA. (2015a). EJSCREEN: Environmental Justice Screening Tool.

USEPA. (2015b). Environmental Resilience: Exploring Scientific Concepts for Strengthening Community Resilience to Disasters. EPA/600/R-15/163. 45 pp., U.S. Environmental Protection Agency.

USEPA. (2016a). Evaluating Urban Resilience to Climate Change: A Multi-Sector Approach. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-16/365, 2016.

USEPA. (2016b). U.S. EPA Air Data: Air Quality Data Collected at Outdoor Monitors Across the US.

USEPA. (2017) National Aquatic Resource Surveys. Background of the National Aquatic Resource Surveys.

USEPA-R1 (U.S. EPA-Region 1). (2014). EPA New England Regional Climate Adaptation Plan. Water Quality Standards: 52. EPA Publication Number 100K14001H. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region1-climate-change-adaptation-plan.pdf.

USEPA-R2 (USEPA-Region 2). (2014). EPA Region 2 Climate Change Adaptation Implementation Plan. Communities and Vulnerable Populations: 36. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region2-climate-change-adaptation-plan.pdf.

USEPA-R3 (EPA-Region 3). (2014). U.S. Environmental Protection Agency Mid-Atlantic Region III Climate Change Adaptation Implementation Plan. Accessed July 7, 2017 from https://19january2017snapshot.epa.gov/sites/production/files/2016-08/documents/region3-climatechange-adaptation-plan.pdf.

USEPA-R4 (USEPA-Region 4). (2014). U.S. EPA Region 4 Adaptation Implementation Plan. Goal 2 – Protecting EPA Region 4's Waters: 85; Appendix B – Region 4 Priority Actions Matrix: 118. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region4-climate-changeadaptation-plan.pdf.

USEPA-R5 (USEPA-Region 5). (2014). U.S. EPA Region 5 Climate Change Adaptation Implementation Plan. Water Division: 13; Superfund Division: 17. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region5-climate-change-adaptation-plan.pdf.

USEPA-R6 (USEPA-Region 6). (2014). U.S. EPA Region 6 Climate Change Adaptation Implementation Plan. 3.4 Greening Assistance Agreements: 31; Table 1: EPA Region 6 Climate Change Vulnerabilities and Priority Actions: 38. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region6-climate-change-adaptation-plan.pdf.

USEPA-R7 (USEPA-Region 7). (2014). Region 7 Climate Change Adaptation Implementation Plan.

Region 7 Monitoring and Evaluation of Priority Actions: 29, 31. EPA Publication Number: EPA-100K-14-001M. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region7climate-change-adaptation-plan.pdf.

USEPA-R8 (USEPA-Region 8). (2014). EPA Region 8 Climate Adaptation Implementation Plan. Priority Actions to Address Program Vulnerabilities: 27. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region8-climate-change-adaptation-plan.pdf.

USEPA-R9 (USEPA-Region 9). (2014). EPA Region 9 Climate Change Adaptation Implementation Plan. Region-Wide Themes for Climate Change Adaptation: 14-15. EPA Publication Number: EPA-100-K-14-001P. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region9-climate-change-adaptation-plan.pdf.

USEPA-R10 (USEPA-Region 10). (2014). EPA Region 10 Climate Change Adaptation Implementation Plan. Region 10 General Vulnerabilities: 13. Accessed July 7, 2017 from https://www3.epa.gov/climatechange/Downloads/Region10-climate-change-adaptation-plan.pdf.

USFS (United States Forest Service). (2017). Forest Inventory and Analysis Database, St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station.

van de Kerk, G. and Manuel, A. (2014). Sustainable Society Index 2014 Report. The Hague, Netherlands, Sustainable Society Foundation: 90.

Vickerman, S. and Kagan, J.S. (2014). Assessing ecological integrity across jurisdictions and scales. Institutes for Natural Resources, Oregon Biodiversity Information Center, Portland State University, Portland, Oregon.

Walsh, F. (2007). Traumatic loss and major disasters: Strengthening family and community resilience. *Family Process* 46:207-227.

Walther, G. Post, E., Convey, P., Menzel, A., Parmesani, C. Beebee, T.J.C. (2002) Ecological responses to recent climate change. *Nature* 416: 389-395.

Wang, Z., Wang, J. (2017) Service restoration based on AMI and networked MGs under extreme weather conditions. *IET Generation Transmission and Distribution* 11: 401-408.

Wedawatta, G., Ingirige, B., Amaratunga, D. (2010) Building up resilience of construction sector SMEs and their supply chains to extreme weather events. *International Journal of Strategic Property Management* 14: 362-372.

Wood, N.J., Burton, C.G. and Cutter, S.L. (2010). Community variations in social vulnerability to Cascadia-related tsunamis in the U.S. Pacific Northwest. *Natural Hazards* 52(2):369-389.

Zartarian, V. (2016). Integrated EPA Science for Decision-Making: Lawrence, MA Water Strategy. National Environmental Health Association (NEHA) Conference, Session: Environmental Health Science -- Tools and Approaches for a Changing World. June 15, 2016. San Antonio, TX.

Zimmerman, R. (2017) Effective public service communication networks for climate change adaptation. in W.L. Filho and J.M. Keenan (Eds.) *Climate Change Adaptation in North America: Experiences, Case Studies and Best Practices* (pp. 241-259). Berlin: Springer.

Zimmerman, R., Zhu, Q., de Leon, F., Guo, Q. (2017) Conceptual modeling framework to integrate resilient and interdependent infrastructure in extreme weather. *Journal of Infrastructure Systems* 23: 04017034.

9. Appendices

Appendix A – CRSI Database Overview

EPA's Cumulative Resilience Screening Index (CRSI) characterizes community resilience based on a suite of indicators that are grouped into broad categories or domains of community resiliency traits in the context of natural hazard events. Data collected by the following institutions and organizations were used to populate indicator metrics to quantify CRSI:

- American Lung Association
- Association of Religion Data Archives
- Centers for Disease Control and Prevention
- Instituto de Pesquisas Ecológicas Brasil
- National Telecommunication and Information Administration
- United States Census Bureau
- United States Department of Agriculture
- United States Department of Agriculture
- United States Department of Health and Human Services
- United States Department of Homeland Security
- United States Department of Housing and Urban Development
- United States Department of Justice
- United States Department of Labor
- United States Department of the Interior
- United States Department of Transportation
- United States Energy Information Administration
- United States Environmental Protection Agency
- University of Wisconsin Population Health Institute

To the extent possible, specific data sets and sources were selected for use in the development of CRSI based on the following criteria:

- Data were publicly available and easy to obtain
- Data collection methods were credible and reliable
- Data sets were available at county-scale for population-based information and acres, meters, hydrologic units or similar for geospatial
- Data collected was national in scope
- Data were available for all or a portion of 2000 – 2015 and were likely to collected in the future

Metrics serve as the foundation of CRSI. The following pages contain indicator heading and details about corresponding metrics including basic information such as the data source(s) and years available, as well as calculations performed to create the final datasets. We examined the distribution for all metrics for pooled data (2000-2015). The distribution graphics are provided at the end of each indicatormetric section. The y-axis scale shown in each graph reflects the true unit scale of results.

Domain: Risk

Indicator: Exposure

The exposure indicator likelihood of hazard occurrence across a full spectrum of geologic and atmospheric events as well as additional technological hazards that may co-occur

Metric List for Domain: Risk- Indicator: Exposure

Metric Variable: SprFnd_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land that falls within a 5-mile radius of any listed Superfund Site. Generated using ArcMap 10.4, NLCD 2011, and superfund site locations (U.S. EPA).
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Nuke_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land that falls within a 10-mile radius of any nuclear power, weapons, research, or storage facility. Generated using ArcMap 10.4, NLCD 2011, and nuclear site locations (multi source) Data Source: Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: TRI_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land that falls within a 1/4 mile radius of a TRI listed facility. Generated using ArcMap 10.4, NLCD 2011, and TRI site locations.
Data Source: Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: RCRA_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County

Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land that falls with a ¼ mile radius of any RCRA site (LQGs, TSDs, and TRANSs). Generated using ArcMap 10.4, NLCD 2011 and U.S. EPA FRS geodatabase.
Data Source: Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Basic_Hurr
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Potential tornado exposure factor based on proximity to historic hurricane hazard source. Generated using ArcMap 10.4 and historic hurricane data (NOAA). Data Source: Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Basic_Tndo
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Potential tornado exposure factor based on proximity to historic tornado hazard source. Generated using ArcMap 10.4 and historic tornado data (NOAA). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Hurr_Exp Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land impacted by past hurricane hazards. Generated using ArcMap 10.4, NLCD 2011 and historic hurricane data (NOAA). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Torn_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land impacted by past tornado hazards. Generated using ArcMap 10.4, NLCD 2011, and historic tornado data (NOAA). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Inflood_Exp
Source Measurement: Score

Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land potentially impacted by inland flooding hazards. Generated using ArcMap 10.4, NLCD 2011, and rivers and streams data (USGS).
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: CFlood_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land potentially impacted by coastal flooding hazards. Generated using ArcMap 10.4, NLCD 2011 coastal elevation data (EPA).
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: EQ_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land impacted by earthquake hazards at a peak ground acceleration (PGA) above the chosen threshold. Generated using ArcMap 10.4, NLCD 2011 and earthquake hazard mapping data (USGS). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Fire_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land impacted by wildfire. Generated using ArcMap 10.4, NLCD 2011 and historic wildfire data (USGS). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Drght_Exp Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land impacted by drought. Generated using ArcMap 10.4, NLCD 2011 and historic drought data (USGS). Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

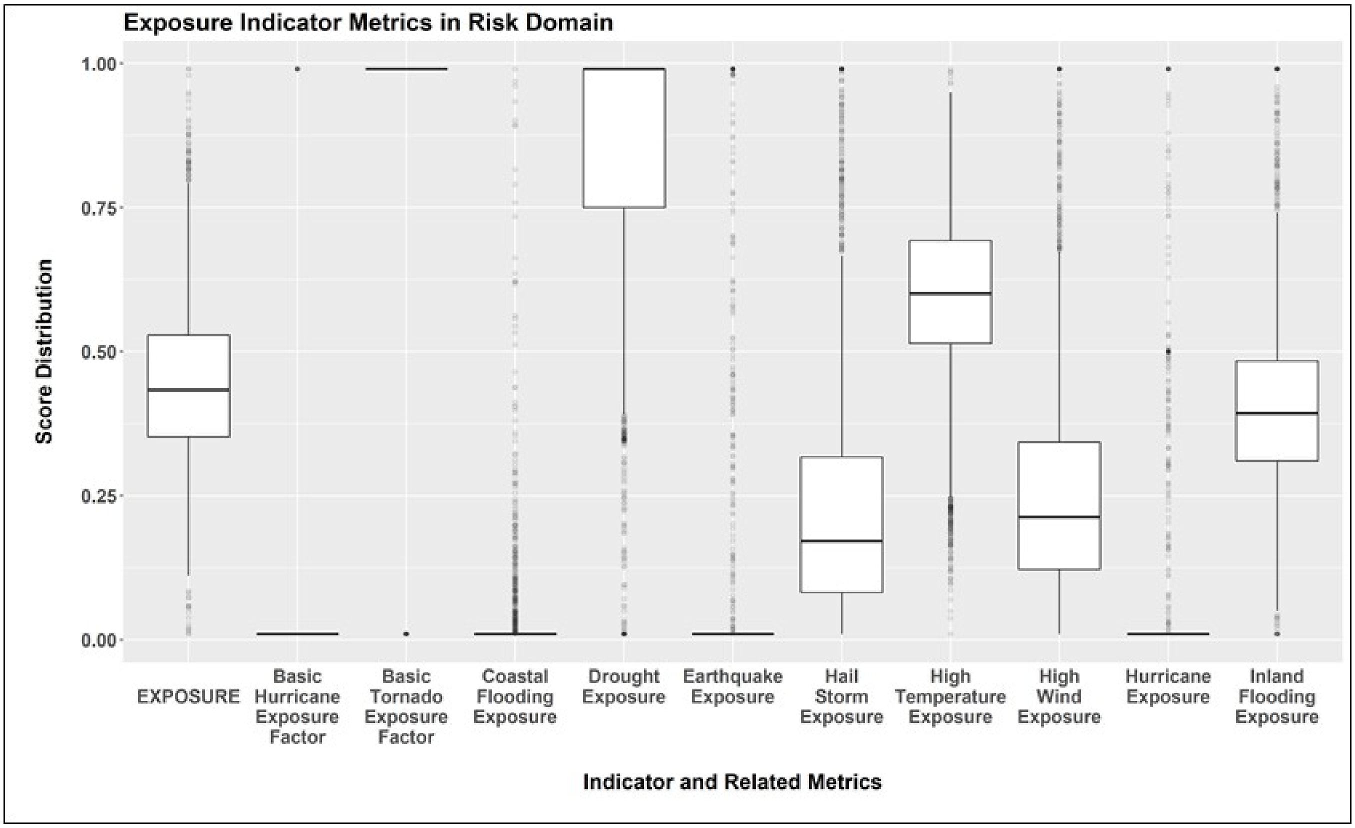
Metric Variable: Wind_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Average number of annual wind events with gusts > 45 mph. Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

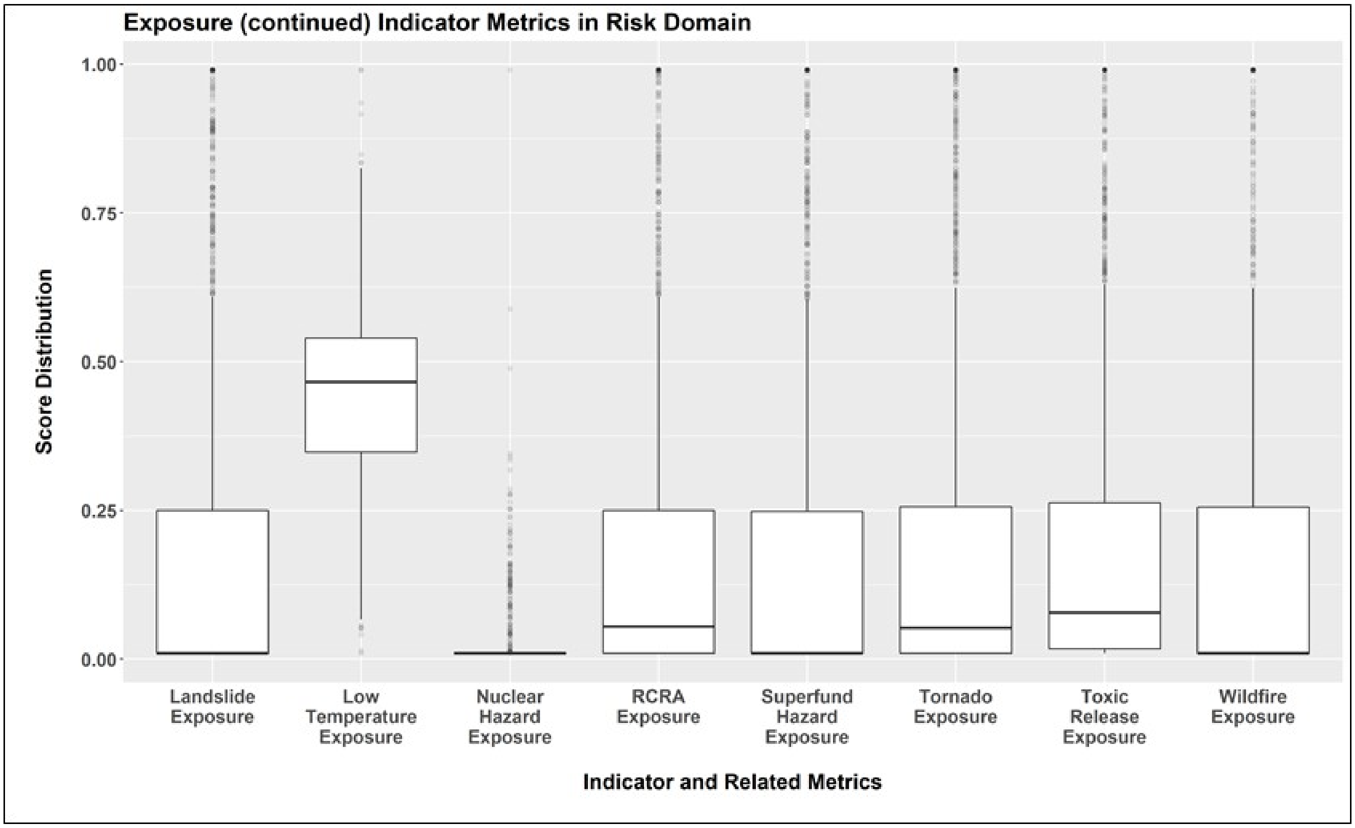
Metric Variable: Hail_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Average number of annual hail storms. Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: LndSld_Exp
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the proportion of land at moderate risk of exposure to landslide activity. Generated using ArcMap 10.4, NLCD 2011 and landslide hazaed data (USGS). Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: ExHTemp_Exp
Source Measurement: Average deviation of annual maximum values from the 32-year average high temps.
Years Available: 2000 - 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Proportion of land exposed to extreme high temperatures. Three time periods are derived from a suite of measures from 2000-2011. Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: ExLTemp_Exp
Source Measurement: Average deviation of annual minimum values from the 32-year average high temps.
Years Available: 2000 - 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: The low temperature extreme values calculated for each U.S. County. Three time periods derived from a suite of measures from 2000-2011. Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page


Exposure Indicator Metrics in Risk Domain
1.00
0.75
0.50
0.25
0.00
Score Distribution
EXPOSURE
Basic Hurricane Exposure Factor
Basic Tornado Exposure Factor
Coastal Flooding Exposure
Drought Exposure
Earthquake Exposure
Hail Storm Exposure
High Temperature Exposure
High Wind Exposure
Hurricane Exposure
Inland Flooding Exposure
Indicator and Related Metrics



Exposure (continued) Indicator Metrics in Risk Domain
Score Distribution
1.00
0.75
0.50
0.25
0.00
Landslide Exposure
Low Temperature Exposure
Nuclear Hazard Exposure
RCRA Exposure
Superfund Hazard Exposure
Tornado Exposure
Toxic Release Exposure
Wildfire Exposure
Indicator and Related Metrics

Indicator: Loss

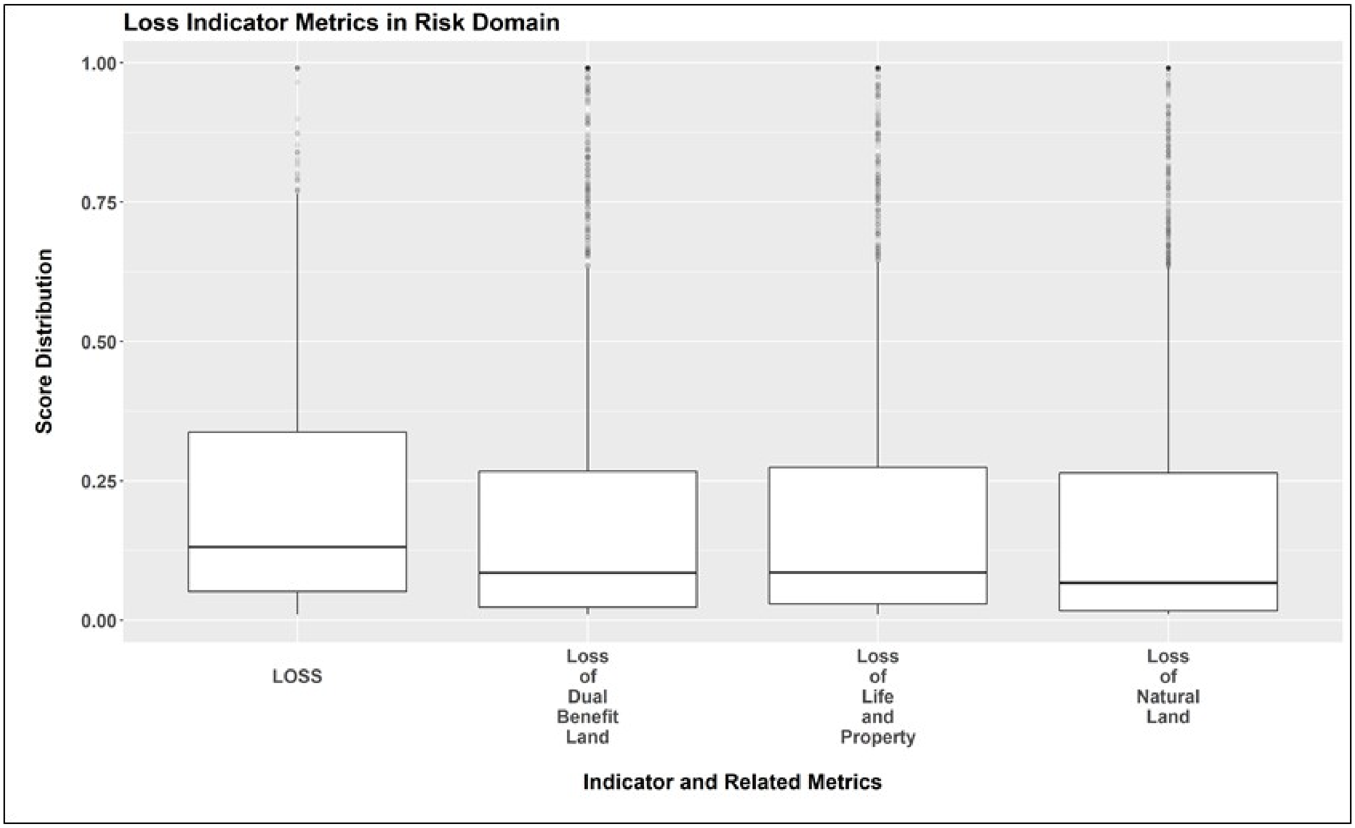
The loss indicator addresses an aspect of a place's vulnerability represented through historical loss of life and property (including crops) associated with specific

Metric List for Domain: Risk- Indicator: Loss

Metric Variable: Nat_loss
Source Measurement: Score
Years Available: 2000 - 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the loss of natural land to impervious surfaces. Calculated using ArcMap 10.4, NLCD 2011, 2006 to 2011 Percent Developed Imperviousness Change (NLCD).
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Dua_loss
Source Measurement: Score
Years Available: 2000 - 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the loss of natural land to impervious surfaces and crop land. Calculated using ArcMap 10.4, NLCD 2011, 2006 to 2011 Percent Developed Imperviousness Change (NLCD) and changes in land type such as croplands and managed areas. Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: Dev_loss
Source Measurement: Score
Years Available: 2015
Smallest Geospatial Level Available: County
Missing Data Handling: Zero
Calculation Method: Score calculated based on the loss of human life and property as result of adverse natural hazards. Summary of losses derived from Spatial Hazard Events and Losses Database (SHELDUS) available at http://hvri.geog.sc.edu/ SHELDUS) Data Source: U.S. Environmental Protection Agency https://edg.epa.gov/metadata/catalog/main/home.page



Domain: Governance

Indicator: Community Preparedness

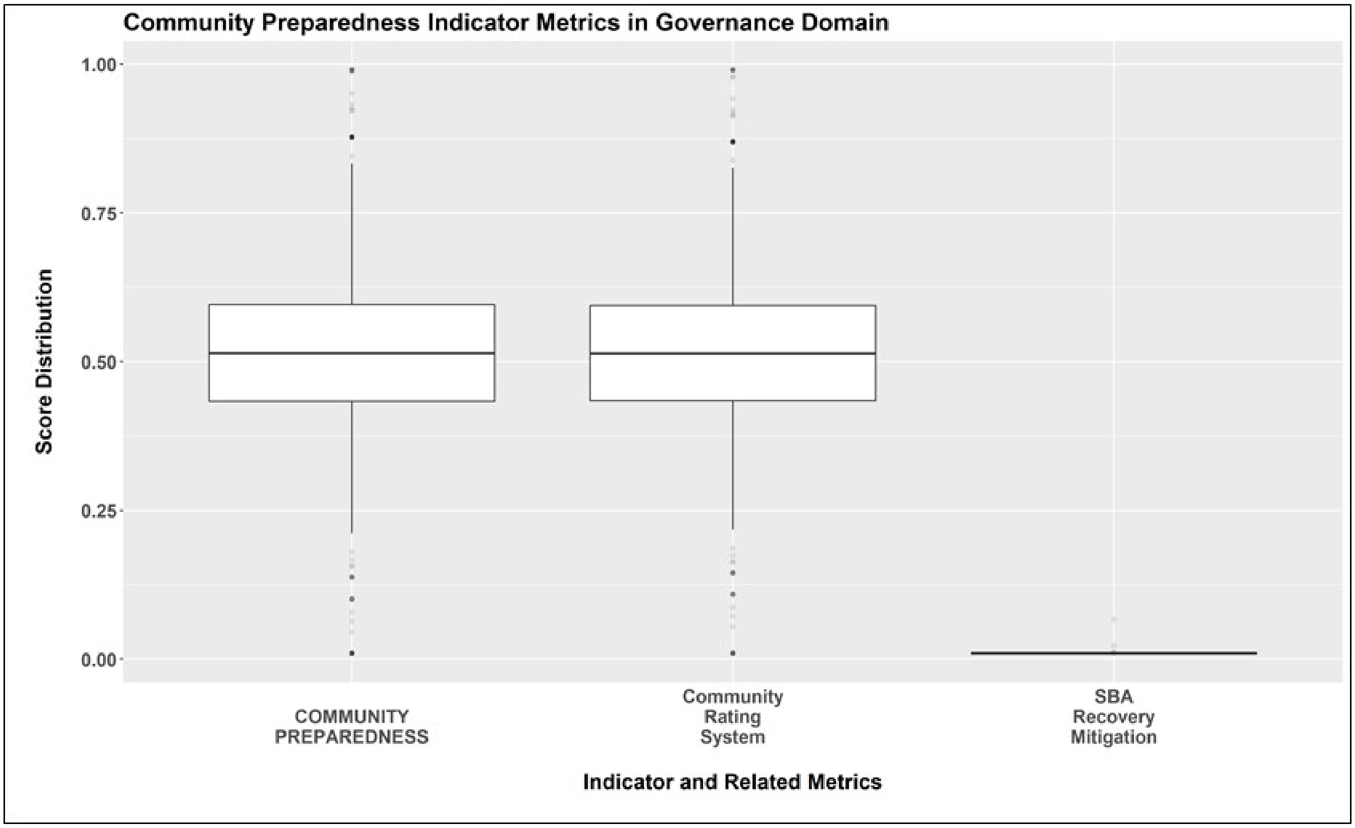
The community preparedness indicator addresses community resilience strengthening and structure hazard mitigation

Metric List for Domain: Risk- Community Preparedness

Metric Variable: CRS
Source Measurement: Community Rating System class designation for floodplain management Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: Federal Emergency Management Agency
https://www.fema.gov/medialibrary/assets/documents/27808

Metric Variable: PCT_SHM
Source Measurement: Percent of Small Business Administration recovery funds spent on hazard mitigation

Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Federal Emergency Management Agency https://www.fema.gov/data-feeds



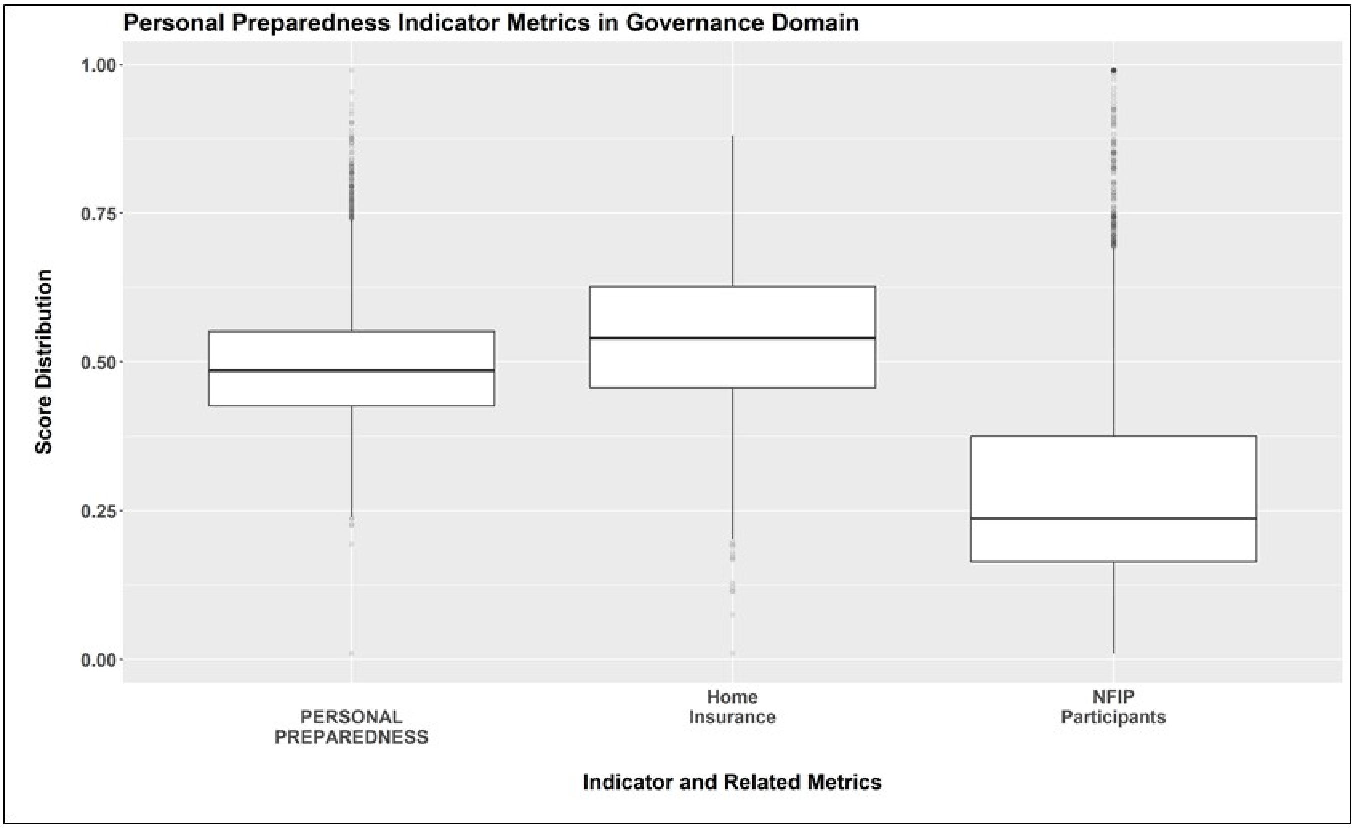
Indicator: Personal Preparedness

The personal preparedness indicator addresses individual or household activities that help protect personal property from acute climate events.

Metric List for Domain Governance: Indicator: Personal Preparedness

Metric Variable: HOMEINS
Source Measurement: Percent of homes with mortgages (which assumes insurance coverage).
Years Available: 2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: NUMNFIP
Source Measurement: Number of National Flood Insurance Program community participants
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: Federal Emergency Management Agency https://www.fema.gov/data-feeds

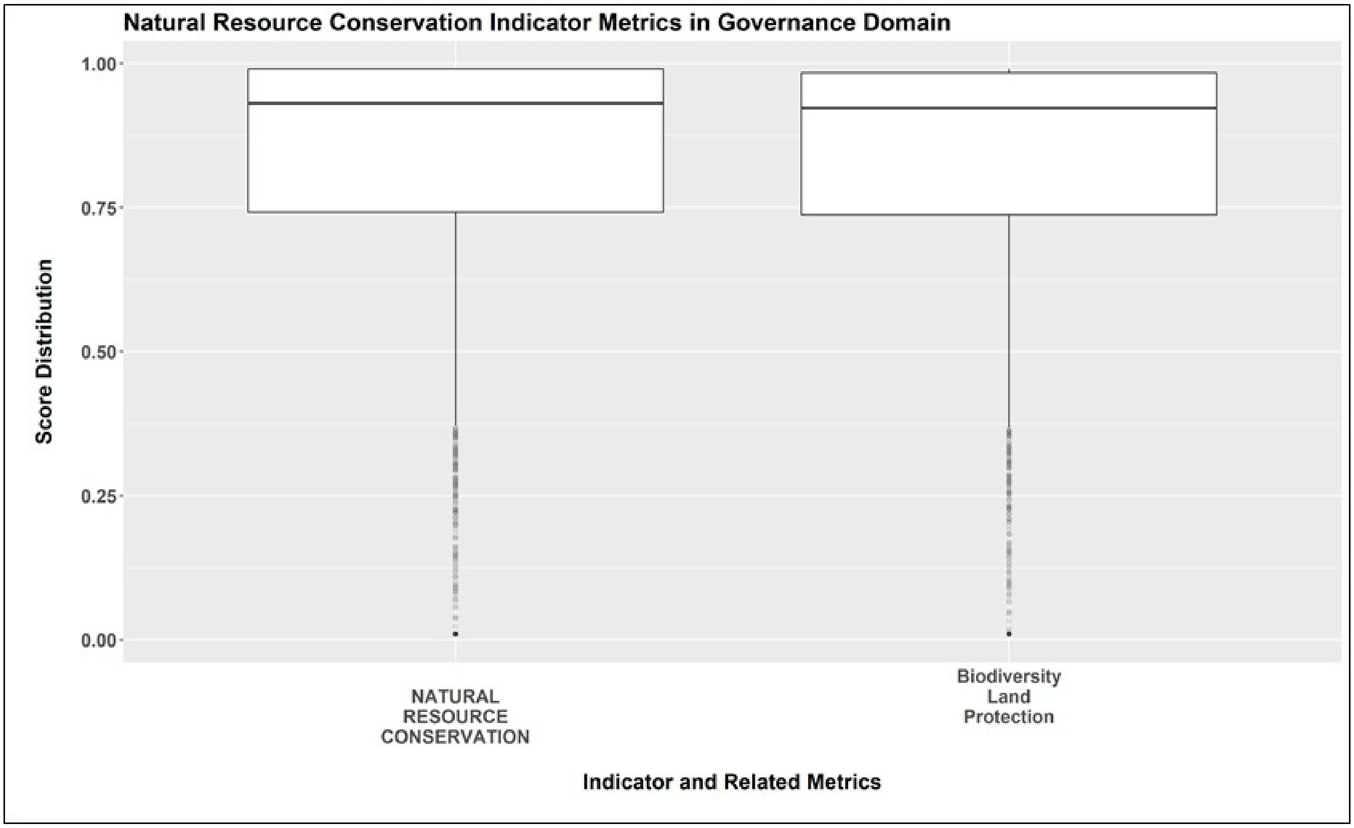


Indicator: Natural Resource Conservation

The natural resource conservation indicator addresses the protection of natural resources from anthropogenic activities which usually aids an ecosystem's ability to recover from acute natural hazard events.

Metric List for Domain: Governance – Indicator: Natural Resource Conservation

Metric Variable: DIVCONS
Source Measurement: Land Protection Priority Index for preserving biodiversity*
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: Instituto de Pesquisas Ecológicas Brasil http://www.ipe.org.br/ *
Index is an inverse ordinal scale where a zero or near-zero index is best.



Domain: Society

Indicator: Demographics

The demographics indicator reflects attributes of a community's population and includes aspects of employment potential and vulnerable populations

Metric List for Domain: Governance – Indicator: Demographics

Metric Variable: ALONE65
Source Measurement: Percent of population age 65 or greater and living alone
Years Available: 2008-2015
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of two variables—male and female individuals over the age of 65 and living alone.
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

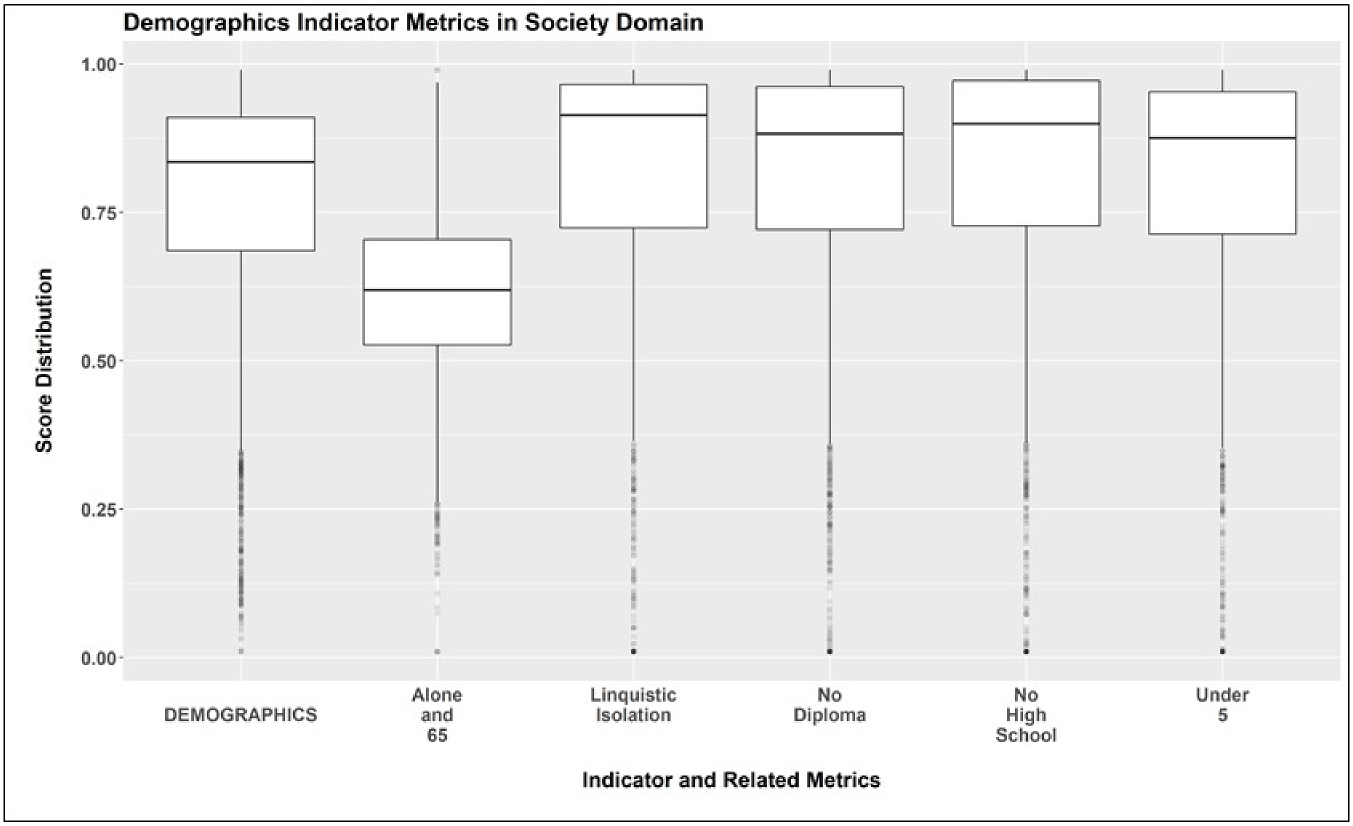
Metric Variable: GRD9_25
Source Measurement: Percent of population age 25 years and over with less than 9th grade education attainment
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: LINGISO
Source Measurement: Percent of population exhibiting limited English language skills
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: NODIPL25
Source Measurement: Percent of population age 25 years and over who attended high school but did not receive a diploma
Years Available: 2006-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: POP5U

Source Measurement: Percent of population under 5 years of age
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/



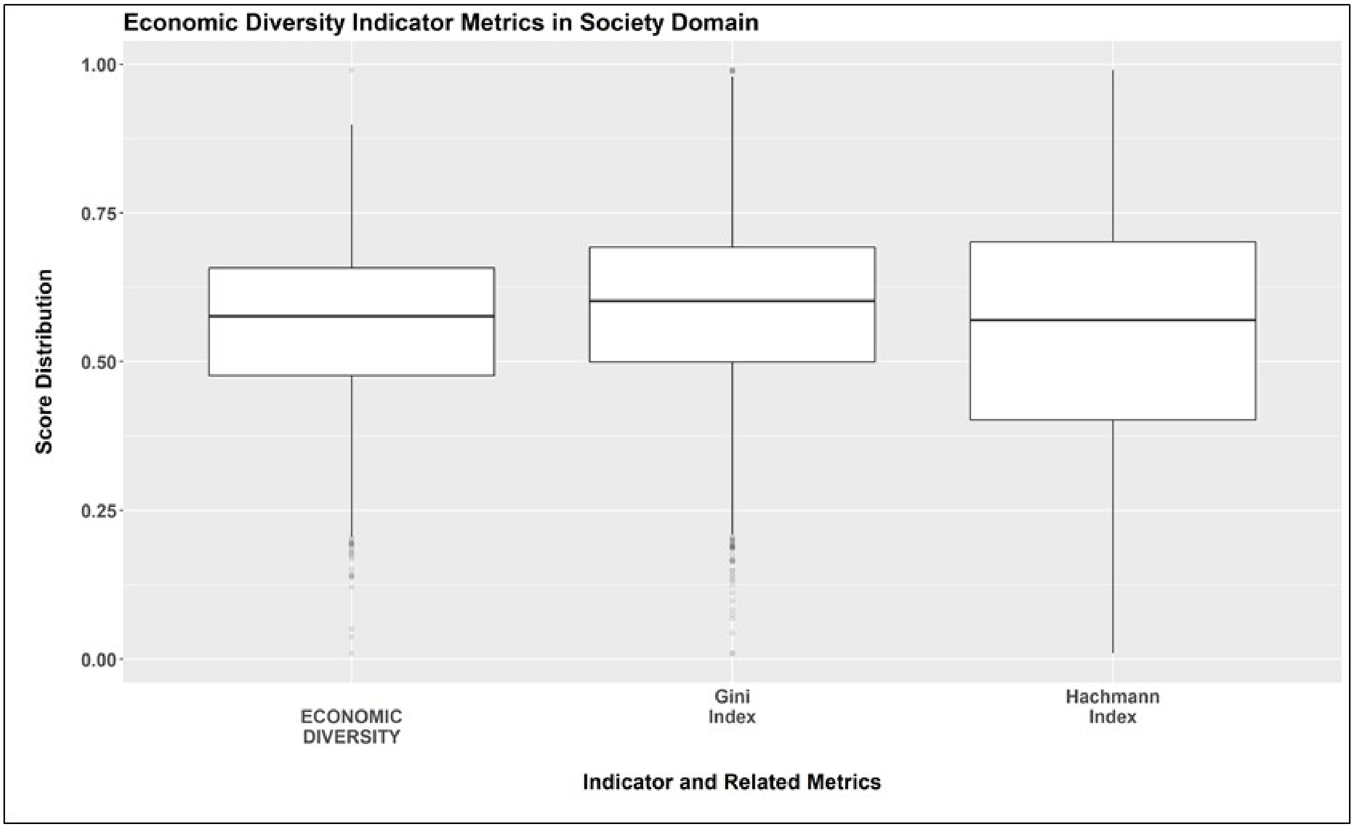
Indicator: Economic Diversity

The economic diversity indicator represents factors associated with economic stability and recoverability within communities

Metric List for Domain: Governance – Indicator: Economic Diversity

Metric Variable: GINI
Source Measurement: Income inequality based on Gini Index
Years Available: 2006-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: HACHI
Source Measurement: Index of economic diversity based on Hachmann calculation method
Years Available: 2005, 2010, 2014
Smallest Geospatial Level Available: County
Calculation Method: For each county, the index is calculated as the reciprocal of the sum of location quotients, which measures industry dependencies, weighted by the distribution of businesses as classified by the North American Industry Classification System (NAICS).
Missing Data Handling: Null fill
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page



Indicator: Health Characteristics

The health characteristics indicator addresses factors associated with healthcare access, special health vulnerability populations, and specific health problems related to or exacerbated by acute natural hazard events.

Metric List for Domain: Society – Indicator: Health Characteristics

Metric Variable: ASTHMA_A
Source Measurement: Percent of adult population living with asthma

Years Available: 2012, 2014, 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were calculated as the average of adult individuals with asthma over the total adult population counts for 2012, 2014, and 2015.
Missing Data Handling: Null fill
Data Source: American Lung Association, http://www.lung.org/ourinitiatives/research/monitoring-trends-in-lung-disease/

Metric Variable: ASTHMA_C
Source Measurement: Percent of population under 18 years of age living with asthma
Years Available: 2012, 2014, 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were calculated as the average of individuals under 18 with asthma over the pediatric population counts for 2012, 2014, and 2015.
Missing Data Handling: Null fill
Data Source: American Lung Association http://www.lung.org/ourinitiatives/research/monitoring-trends-in-lung-disease/

Metric Variable: CNCR
Source Measurement: Incidence of cancer per 100,000 population Years Available: 2009-2013
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: National Cancer Institute https://www.cancer.gov/research/resources/data-catalog

Metric Variable: DBTS
Source Measurement: Percent of population living with diabetes
Years Available: 2004-2016
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: University of Wisconsin Population Health Institute
http://www.countyhealthrankings.org/rankings/data

Metric Variable: HLTHINS
Source Measurement: Percent of population with at least some health insurance coverage
Years Available: 2013-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

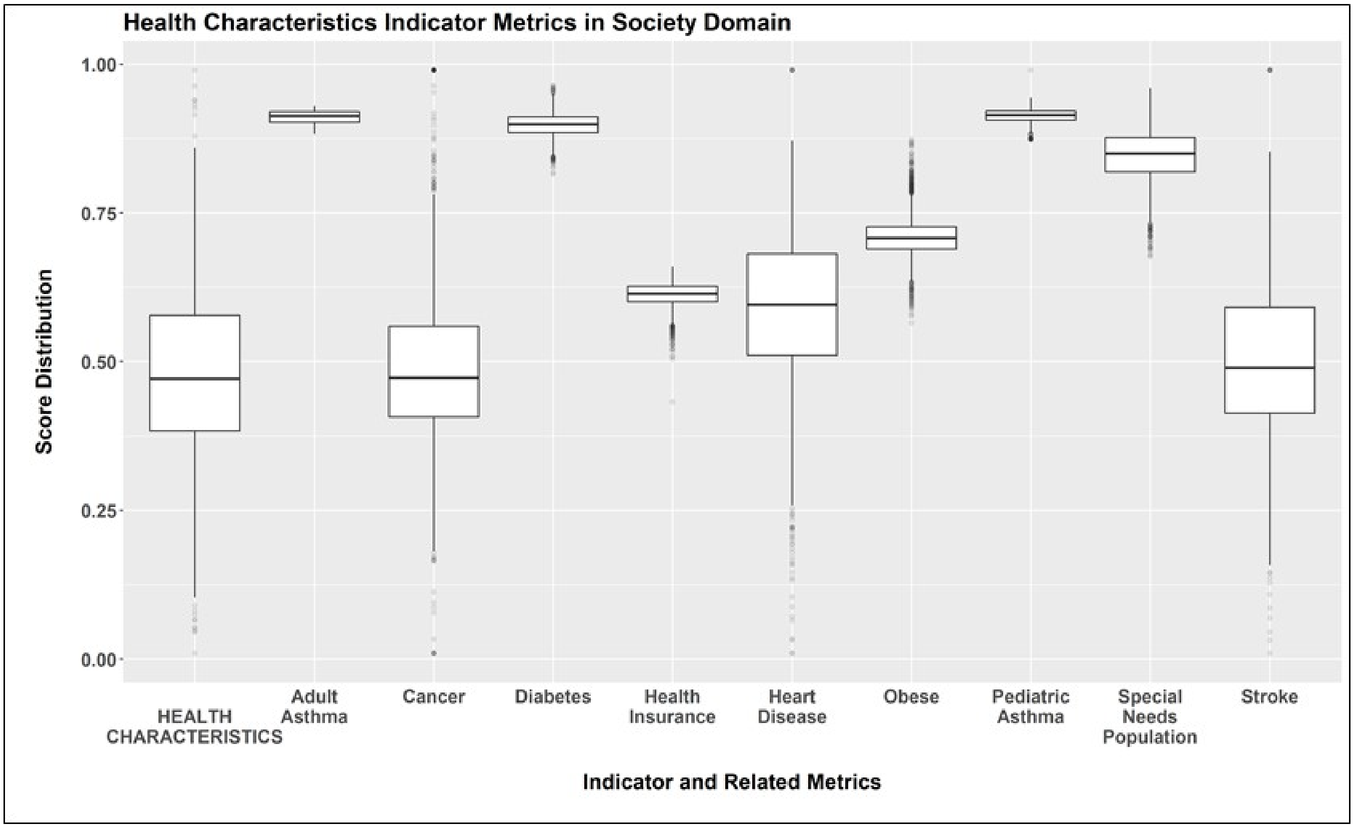
Metric Variable: HRTDS
Source Measurement: Incidence of heart disease per 1,000 population
Years Available: 2007-2013

Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: United States Department of Health and Human Services,
https://www.hhs.gov/about/agencies/omha/about/health-data-sets/index.html

Metric Variable: OBES
Source Measurement: Percent of population diagnosed with obesity
Years Available: 2004-2013
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: University of Wisconsin Population Health Institute,
http://www.countyhealthrankings.org/rankings/data

Metric Variable: SPND
Source Measurement: Percent of population with cognitive and/or physical special needs
Years Available: 2008-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: STRK
Source Measurement: Incidence of stroke per 1,000 medicare population
Years Available: 2007-2013
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: United States Department of Health and Human Services,
https://www.hhs.gov/about/agencies/omha/about/health-data-sets/index.html



Indicator: Labor and Trade Services

The labor and trade services indicator addresses factors related to recoverability from an acute natural hazard event associated with construction.

Metric List for Domain: Society – Indicator: Labor and Trade Services

Source Measurement: Number of concrete construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: FRAME
Source Measurement: Number of construction framing services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County

Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: HWYCON
Source Measurement: Number of highway construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
American Community Survey https://www.census.gov/programs-surveys/acs/

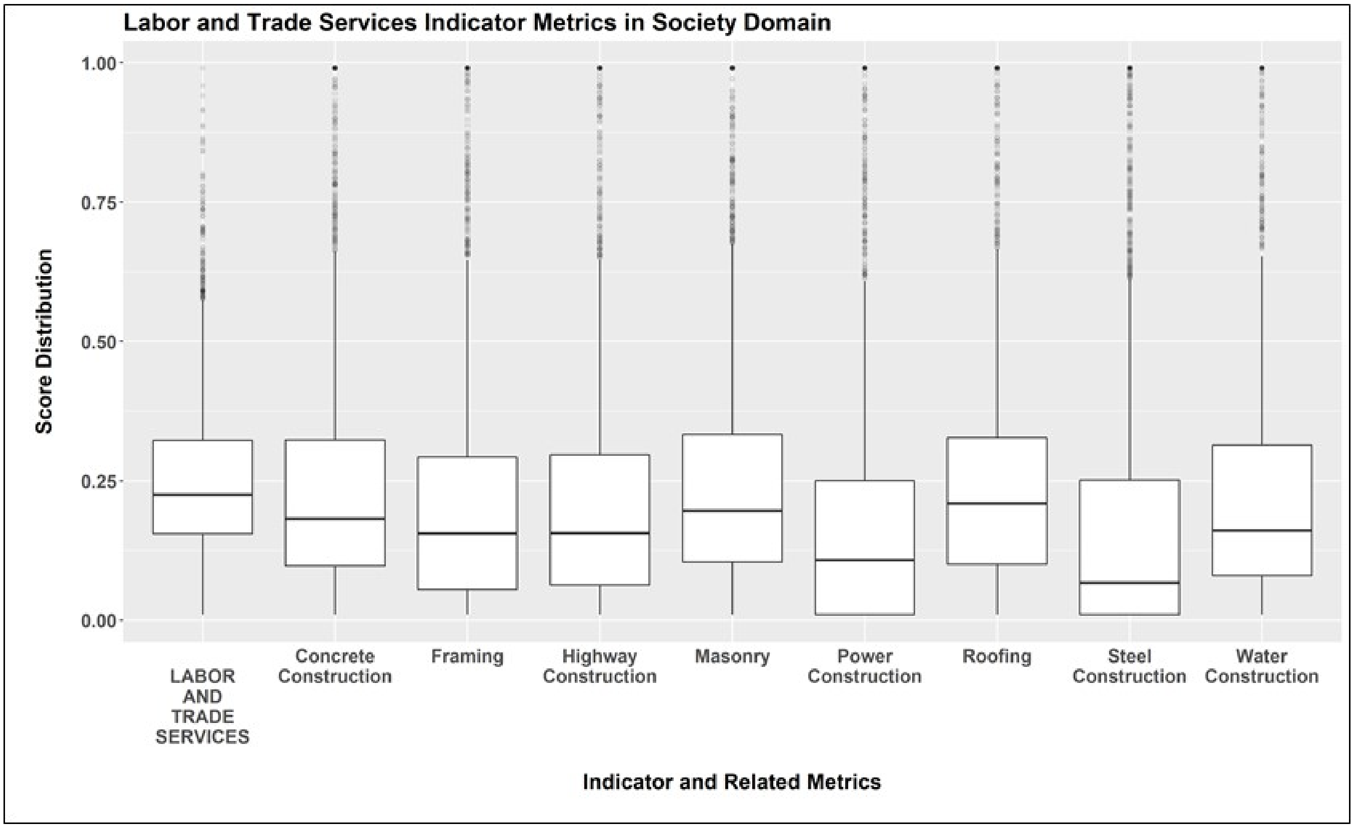
Metric Variable: MASON
Source Measurement: Number of masonry services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: PWRCON
Source Measurement: Number of power construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: ROOF
Source Measurement: Number of roofing construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: STEEL
Source Measurement: Number of steel construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: WTRSWCON
Source Measurement: Number of water and sewer construction services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/



Indicator: Safety and Security

The safety and security indicator addresses the provisioning of emergency and civil services

Metric List for Domain: Society – Indicator: Safety and Security

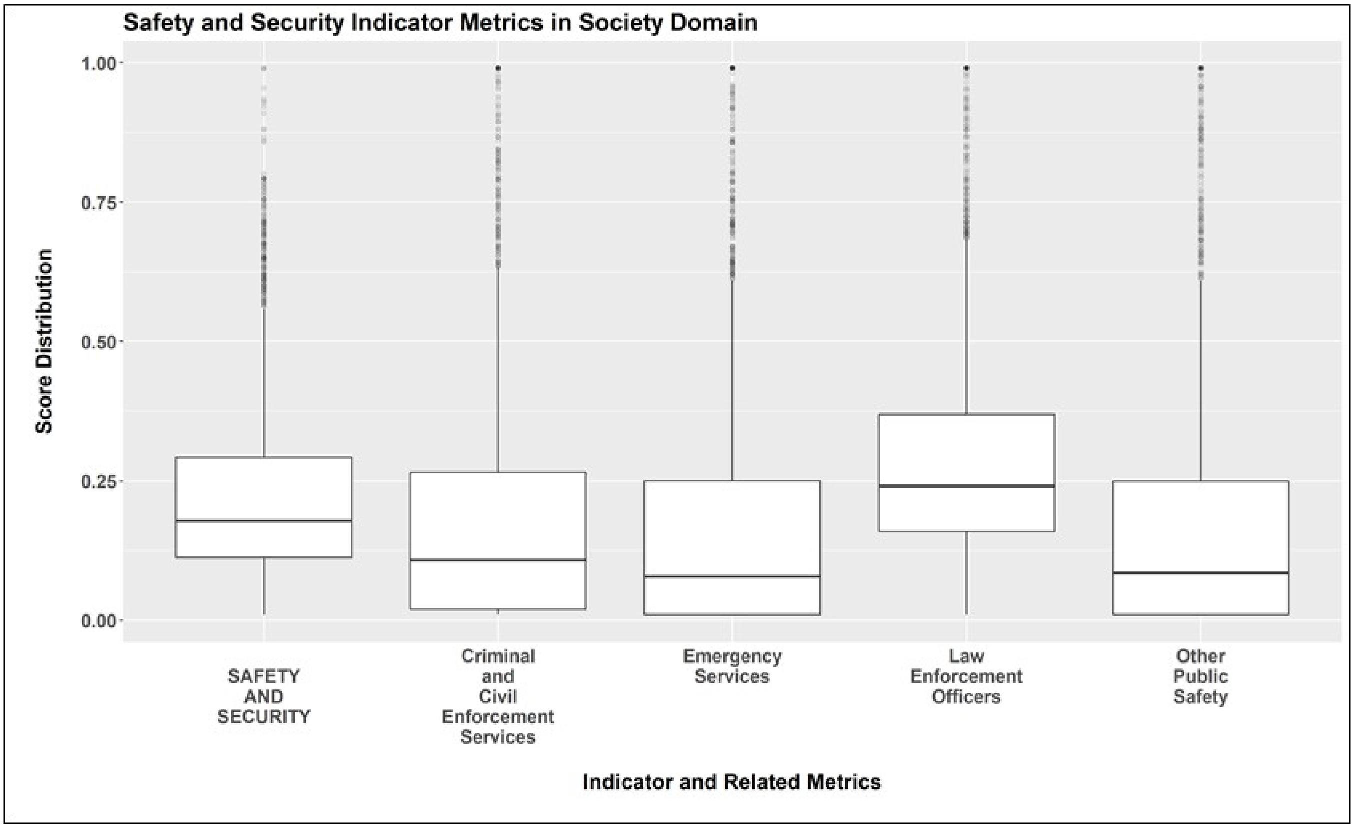
Metric Variable: AMBULNCE
Source Measurement: Number of emergency and civil services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A

Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: LAWENFOR
Source Measurement: Number of law enforcement officers per 100,000 population Years Available: 2004-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Federal Bureau of Investigation https://ucr.fbi.gov/

Metric Variable: POLPROT
Source Measurement: Number of criminal and civil services per 100,000 population
Years Available: 2000-2015
Smallest Geospatial Level Available: County
Calculation Method: Data were calculated as the aggregated sum of all State, Local, and Federal government employees employed in the Police Protection field.
Missing Data Handling: Zero fill
Data Source: Bureau of Labor Statistics https://www.bls.gov/data/

Metric Variable: PUBSAFE
Source Measurement: Number of other public safety services per 100,000
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: Data were calculated as the aggregated sum of all State, Local, and Federal government employees employed in the Police Protection field.
Missing Data Handling: Zero fill
Data Source: Bureau of Labor Statistics https://www.bls.gov/data/



Indicator: Social Cohesion

The social cohesion indicator represents the willingness of members of a society to cooperate with each other in order to survive and prosper.

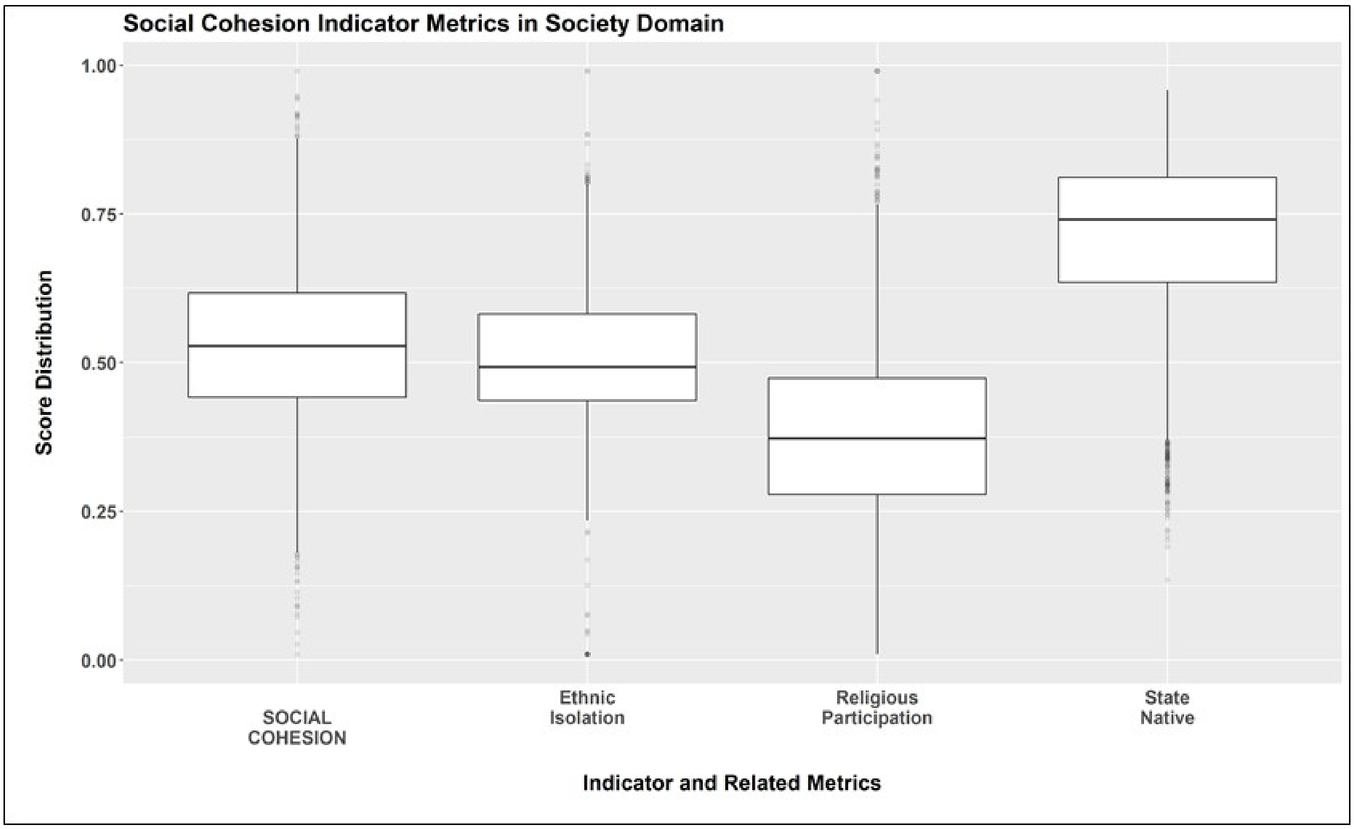
Metric List for Domain: Society – Indicator: Social Cohesion

Metric Variable: ETHNISO
Source Measurement: Degree of ethnic isolation based on calculated index
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: NATRES
Source Measurement: Percent of population born in current state of residence
Years Available: 2005-2014
Smallest Geospatial Level Available: County

Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: TOTRATE
Source Measurement: Religious congregation participation per 1,000 population
Years Available: 2000, 2010
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Association of Religion Data Archives http://www.thearda.com/Archive/browse.asp



Indicator: Social Services

The social services indicator represents a range of critical services provided by government, private, and non-profit organizations

Metric List for Domain: Society – Indicator: Social Services

Metric Variable: AMBSURG
Source Measurement: Number of outpatient and emergency facilities per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: BDORGBNK
Source Measurement: Number of blood and organ banks per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: CHLDCARE
Source Measurement: Number of child care services per 100,000 population under 14
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: EMSOCSRV
Source Measurement: Number of emergency shelter, food and goods services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: HOSP
Source Measurement: Number of hospitals per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: HPSA_M

Source Measurement: Percent of population with sufficient access to mental healthcare providers based on Healthcare Provider Service Area rating for mental health
Years Available: 2009

Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Health Resources and Services Administration https://datawarehouse.hrsa.gov/

Metric Variable: HPSA_P
Source Measurement: Percent of population with sufficient access to primary healthcare providers based on Healthcare Provider Service Area rating for primary care
Years Available: 2009
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Health Resources and Services Administration https://datawarehouse.hrsa.gov/ **Metric Variable: INSADJ**
Source Measurement: Number of insurance claims establishments per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: **MHTHSERV**
Source Measurement: Number of mental healthcare facilities per 100,000 population
Years Available: 2005-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: MUAP
Source Measurement: Score calculated based on the ability of population to access healthcare based on average medically underserved area per population
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: Health Resources and Services Administration https://datawarehouse.hrsa.gov/

Metric Variable: RELIGORG
Source Measurement: Number of religions organizations per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill

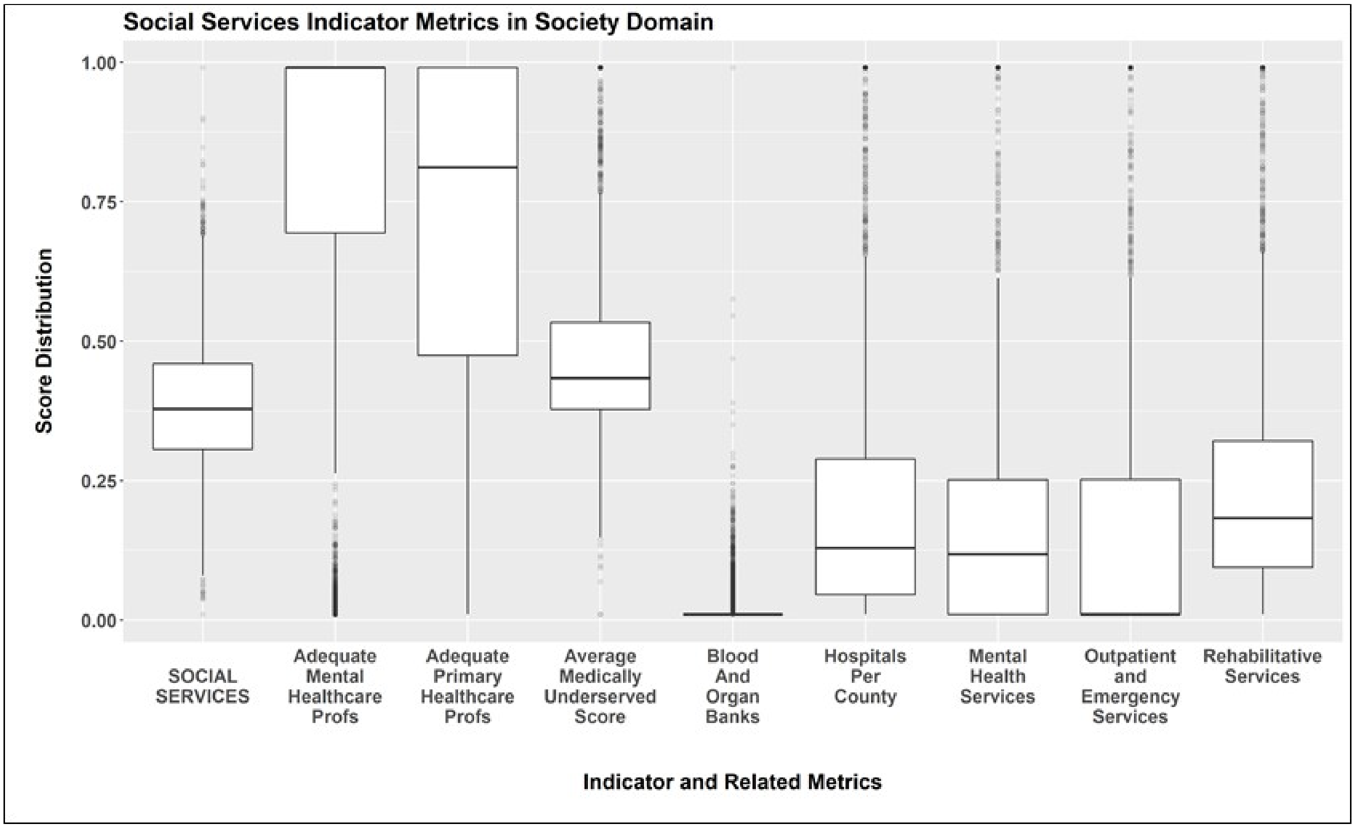
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

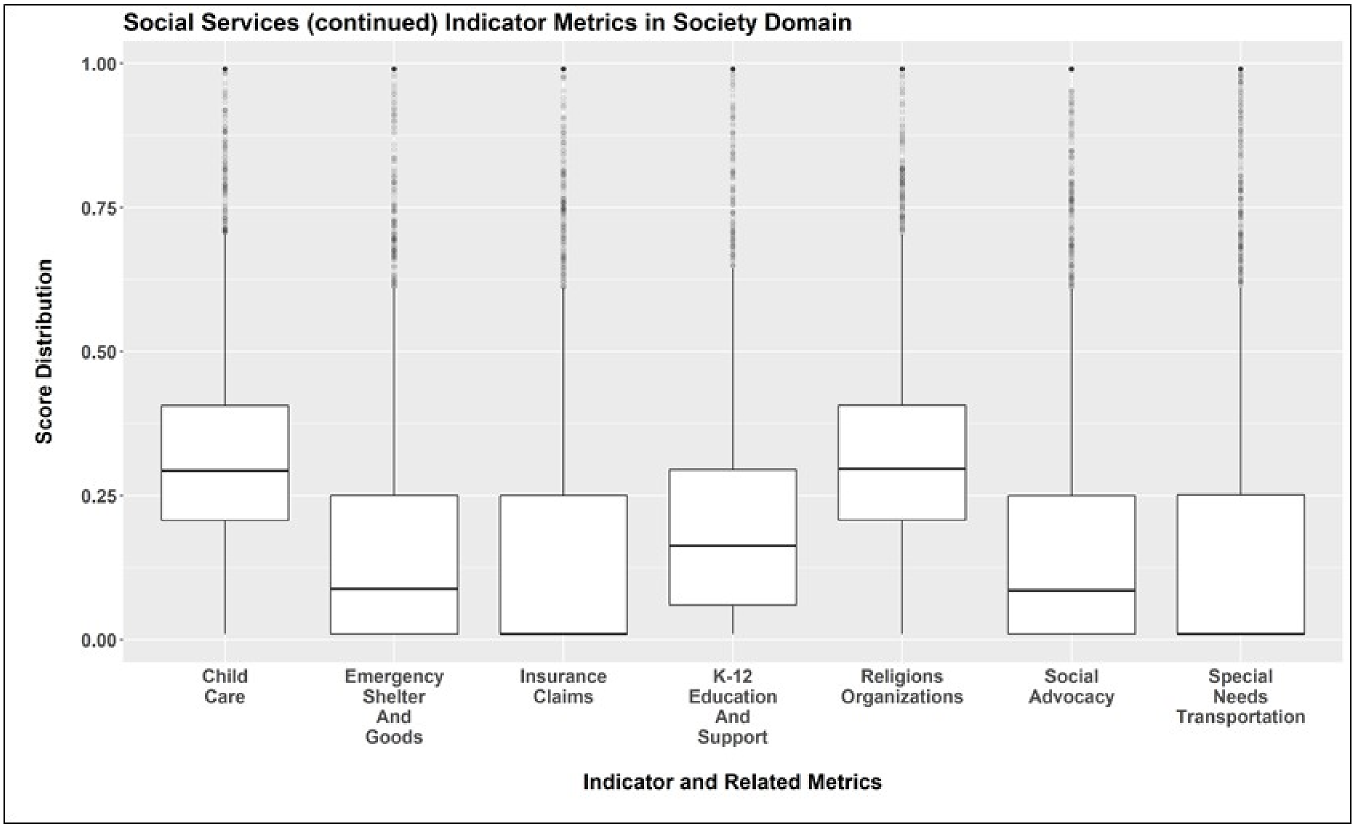
Metric Variable: SCHOOLS
Source Measurement: Number of K-12 education and support facilities per 100,000 population ages 5 to 18
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: SNFAC
Source Measurement: Number of rehabilitative service facilities per 100,000 population
Years Available: 2012-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: SOCADV
Source Measurement: Number of social advocacy services per 100,000 population
Years Available: 2003-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: SPNDTRAN
Source Measurement: Number of special needs transportation services per 100,000 population with special needs
Years Available: 2005-2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/


Social Services Indicator Metrics in Society Domain
Score Distribution
1.00
0.75
0.50
0.25
0.00
SOCIAL SERVICES
Adequate Mental Healthcare Profs
Adequate Primary Healthcare Profs
Average Medically Underserved Score
Blood And Organ Banks
Hospitals Per County
Mental Health Services
Outpatient and Emergency Services
Rehabilitative Services
Indicator and Related Metrics



Indicator: Socio-Economics

The socio-economic indicator relates to employment opportunity and issues associated with personal economics, primarily level of income.

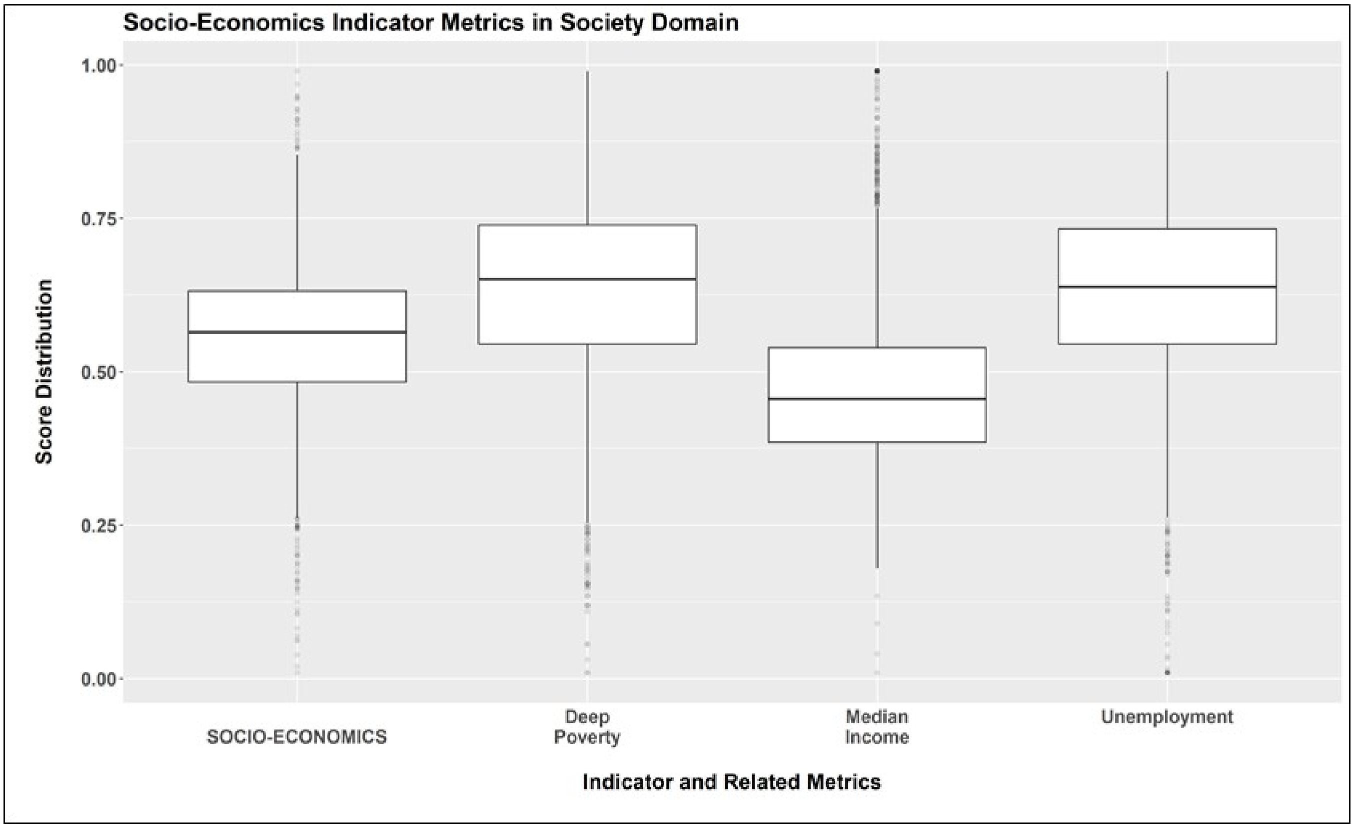
Metric List for Domain: Society – Indicator: Socio-Economics

Metric Variable: DEEPPOV
Source Measurement: Percent of population living at or below 150 percent of poverty threshold
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: MEDINC
Source Measurement: Median household income in inflation adjusted dollars
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A

Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: UNEMPLOY
Source Measurement: Unemployment rate of population ages 16 years and greater
Years Available: 2006-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/



Domain: Built Environment

Indicator: Communications Infrastructure

The communications infrastructure represents a measure of communication continuity to support the ability of a community to perform essential functions before, during and after a natural hazard event

Metric List for Domain: Society – Indicator: Communication Infrastructure

Metric Variable: CELLTOWER
Source Measurement: Number of cell service towers
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: INETACC
Source Measurement: Percent of homes with access to internet service provider(s)
Years Available: 2011, 2012, 2013, 2014
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: National Broadband Map Datasets https://www.broadbandmap.gov/analyze

Metric Variable: LMBROAD
Source Measurement: Number of land mobile broadcast towers
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

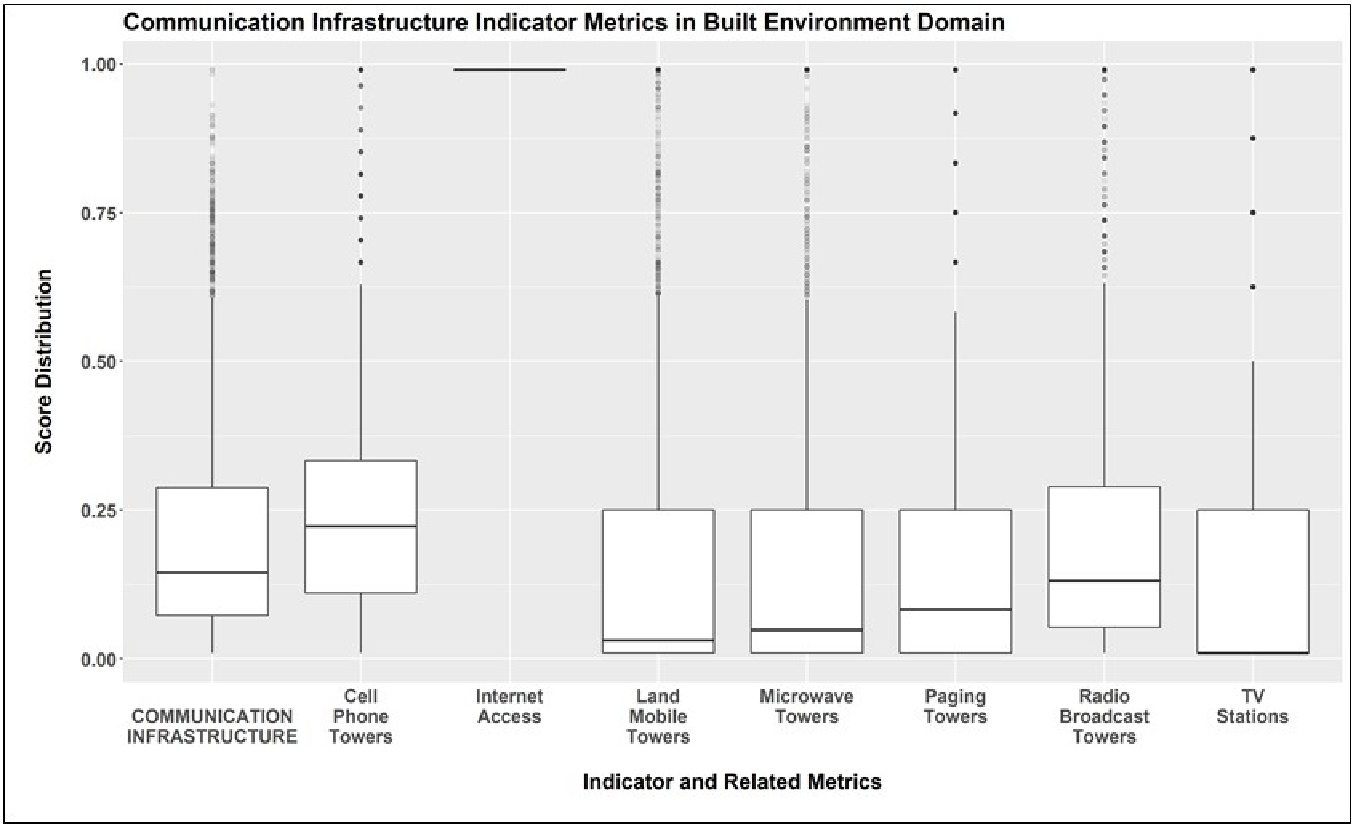
Metric Variable: MICROTOWR
Source Measurement: Number of microwave service towers
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: PAGETOWR
Source Measurement: Number of paging transmission towers
Years Available: 2015
Smallest Geospatial Level Available: County

Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: RADTOWR
Source Measurement: Number of AM and FM radio broadcast transmission towers
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: TVTRANS
Source Measurement: Number of TV station transmitters
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level https://hifld-dhsgii.opendata.arcgis.com/



Communication Infrastructure Indicator Metrics in Built Environment Domain
Score Distribution
1.00
0.75
0.50
0.25
0.00
COMMUNICATION INFRASTRUCTURE
Cell Phone Towers
Internet Access
Land Mobile Towers
Microwave Towers
Paging Towers
Radio Broadcast Towers
TV Stations
Indicator and Related Metrics

Indicator: Housing Characteristics

Housing characteristics relate to the potential resilience weaknesses that the distribution or condition of dwellings introduce to a community in context of adverse natural hazards

Metric List for Domain: Society – Indicator: Housing Characteristics

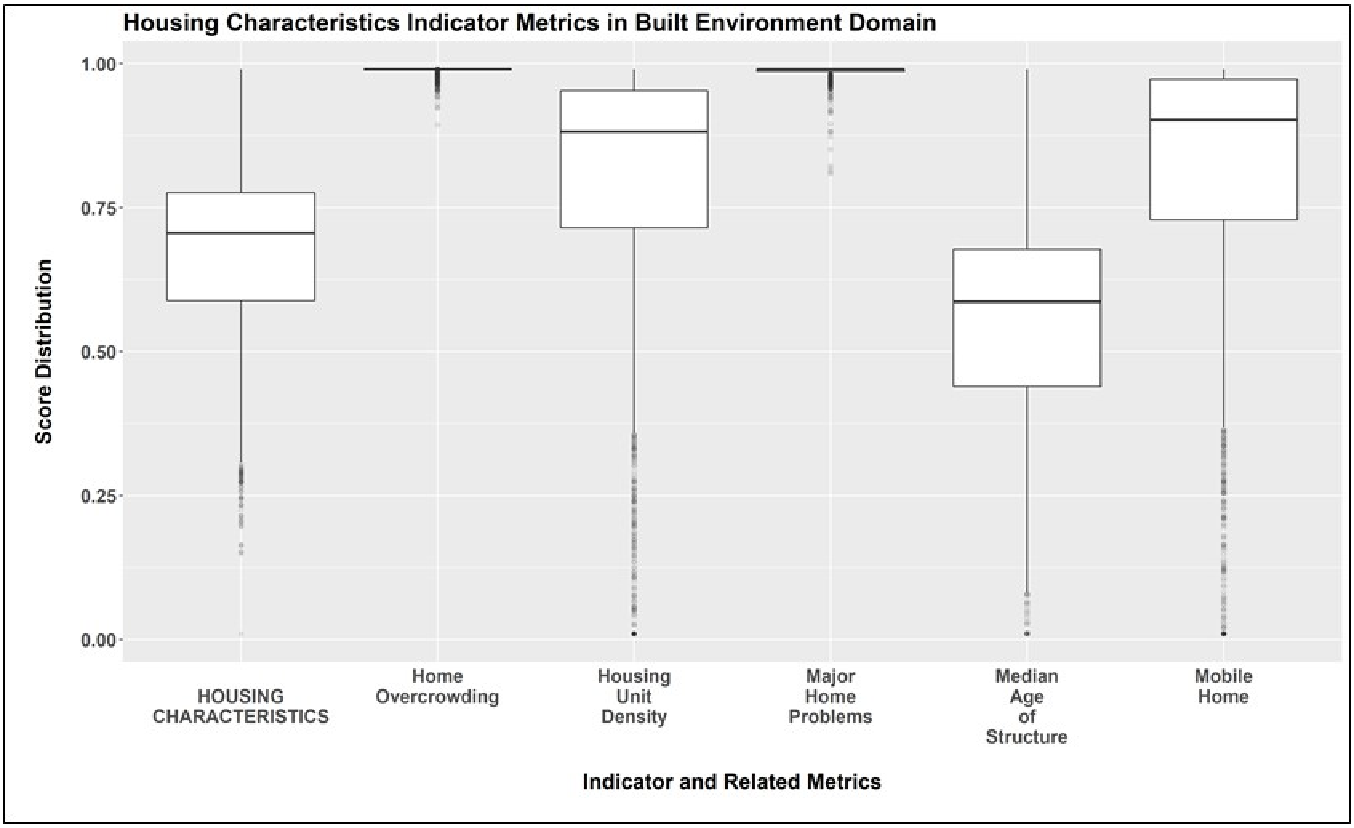
Metric Variable: HOMEAGE
Source Measurement: Median age of residential housing
Years Available: 2005-2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/

Metric Variable: HOMECRWD
Source Measurement: Median age of residential housing
Years Available: 2009, 2013
Smallest Geospatial Level Available: County
Calculation Method: Data from the original dataset were calculated based on the sum of renter and owner occupancy levels.
Missing Data Handling: Zero fill
Data Source: Comprehensive Housing Affordability Strategy
https://www.huduser.gov/portal/datasets/cp/CHAS/data_querytool_chas.html

Metric Variable: HOMEPROB
Source Measurement: Percent of homes with inadequate plumbing and kitchen facilities
Years Available: 2009, 2013
Smallest Geospatial Level Available: County
Calculation Method: Metric is the of sum of renter and owner occupant measures that reflect the same condition.
Missing Data Handling: Zero fill
Data Source: Comprehensive Housing Affordability Strategy
https://www.huduser.gov/portal/datasets/cp/CHAS/data_querytool_chas.html

Metric Variable: HUDENSE
Source Measurement: Number of homes per square mile
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Calculated as total number of housing units/total square miles (within a county)
Missing Data Handling: Null fill
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: MOBLHOME
Source Measurement: Percent of non-permanent or mobile residential structures (excluding vans, campers, etc.)
Years Available: 2007-2013
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: American Community Survey https://www.census.gov/programs-surveys/acs/



Indicator: Transportation Infrastructure

Transportation infrastructure refers a measure of continuity that supports flow of people, goods and services before, during and after a natural hazard event. This includes roads, railways, ports and airports.

Metric List for Domain: Built Environment – Indicator: Transportation Infrastructure

Metric Variable: AIRPORT
Source Measurement: Air Transportation Facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: **HELIPORT**
Source Measurement: Air Transportation Facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: **SEAPLANE**
Source Measurement: Air Transportation Facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/

Metric Variable: **ARTROAD**
Source Measurement: Total miles of urban and rural arterial roads
Years Available: 2014
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Zero fill
Data Source: National Bridge Inventory https://www.fhwa.dot.gov/bridge/nbi/ascii.cfm

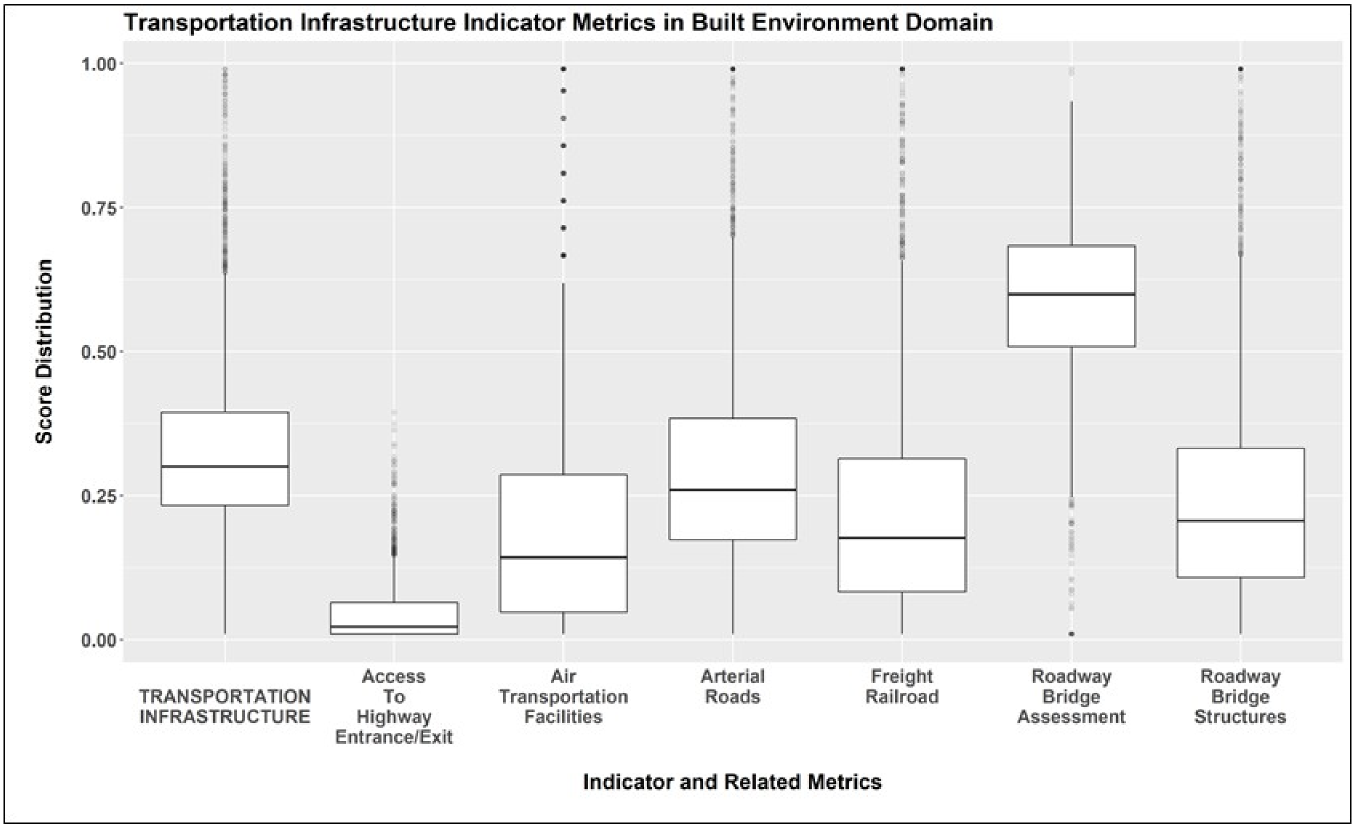
Metric Variable: BRIDGES
Source Measurement: Number of roadway bridge structures
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county. Missing Data Handling: Zero fill
Data Source: National Bridge Inventory https://www.fhwa.dot.gov/bridge/nbi/ascii.cfm

Metric Variable: BRIDRATE
Source Measurement: Roadway bridge structural and functional assessment rating Years Available: 2015
Smallest Geospatial Level Available: County

Calculation Method: Data were geolocated to identify the county FIPS codes based on latitude and longitude provided in original dataset. Counts were then calculated as the sum of the number of data records associated with each county.
Missing Data Handling: Null fill
Data Source: National Bridge Inventory, United States Department of Transportation: https://www.fhwa.dot.gov/bridge/nbi/ascii.cfm

Metric Variable: HWYACC
Source Measurement: Percent population residing within 10-minute drive of highway entrance/exit.
Years Available: 2014
Smallest Geospatial Level Available: County
Calculation Method: Measures derived using ArcMap 10.4, U.S. Census population estimates and ESRI interstate access points data layer.
Missing Data Handling: Zero fill
Data Source: U.S. Environmental Protection Agency
https://edg.epa.gov/metadata/catalog/main/home.page

Metric Variable: RAIL
Source Measurement: Miles of operating freight rails
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of the miles of operating rail line reported by major rail operators within a county.
Missing Data Handling: Zero fill
Data Source: Homeland Infrastructure Foundation-Level Data https://hifld-dhsgii.opendata.arcgis.com/



Indicator: Utilities Infrastructure

Utilities infrastructure refers to a measure of potential continuity for communities to promote access to critical services in context of an adverse natural hazard exposure

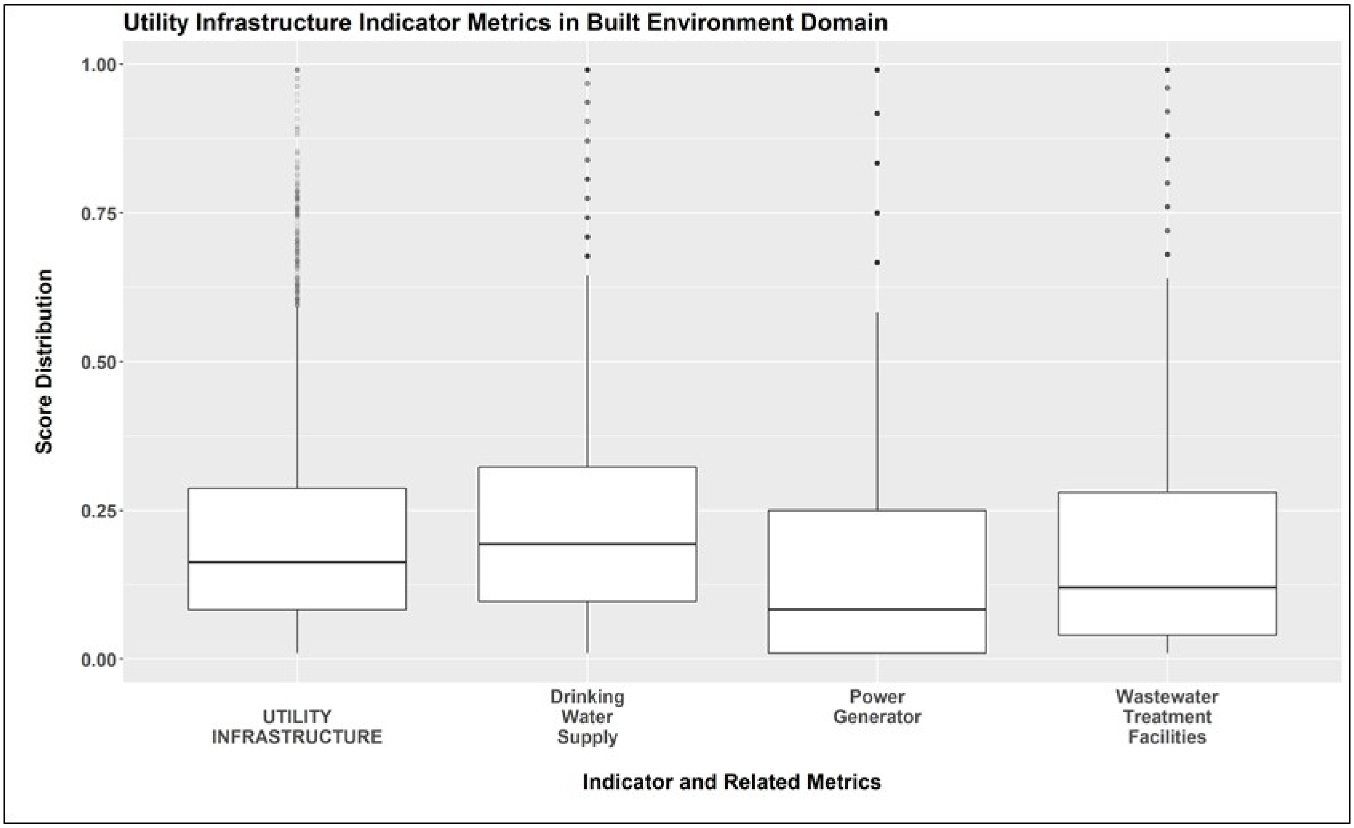
Metric List for Domain: Built Environment – Indicator: Utilities Infrastructure

Metric Variable: COMWATR
Source Measurement: Number of public drinking water supply facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Safe Drinking Water Information System https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-information-system-sdwis-federal-reporting

Metric Variable: POWRPLNT
Source Measurement: Number of power generating facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill

Data Source: United States Energy Information Administration https://www.eia.gov/

Metric Variable: WWTPLNT
Source Measurement: Number of wastewater treatment facilities
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Zero fill
Data Source: Enforcement and Compliance History Online https://echo.epa.gov



Indicator: Vacant Structures

The vacant structures indicator includes the number of vacant business structures, residential and public-access buildings in the county (e.g., hospitals, schools, government buildings).

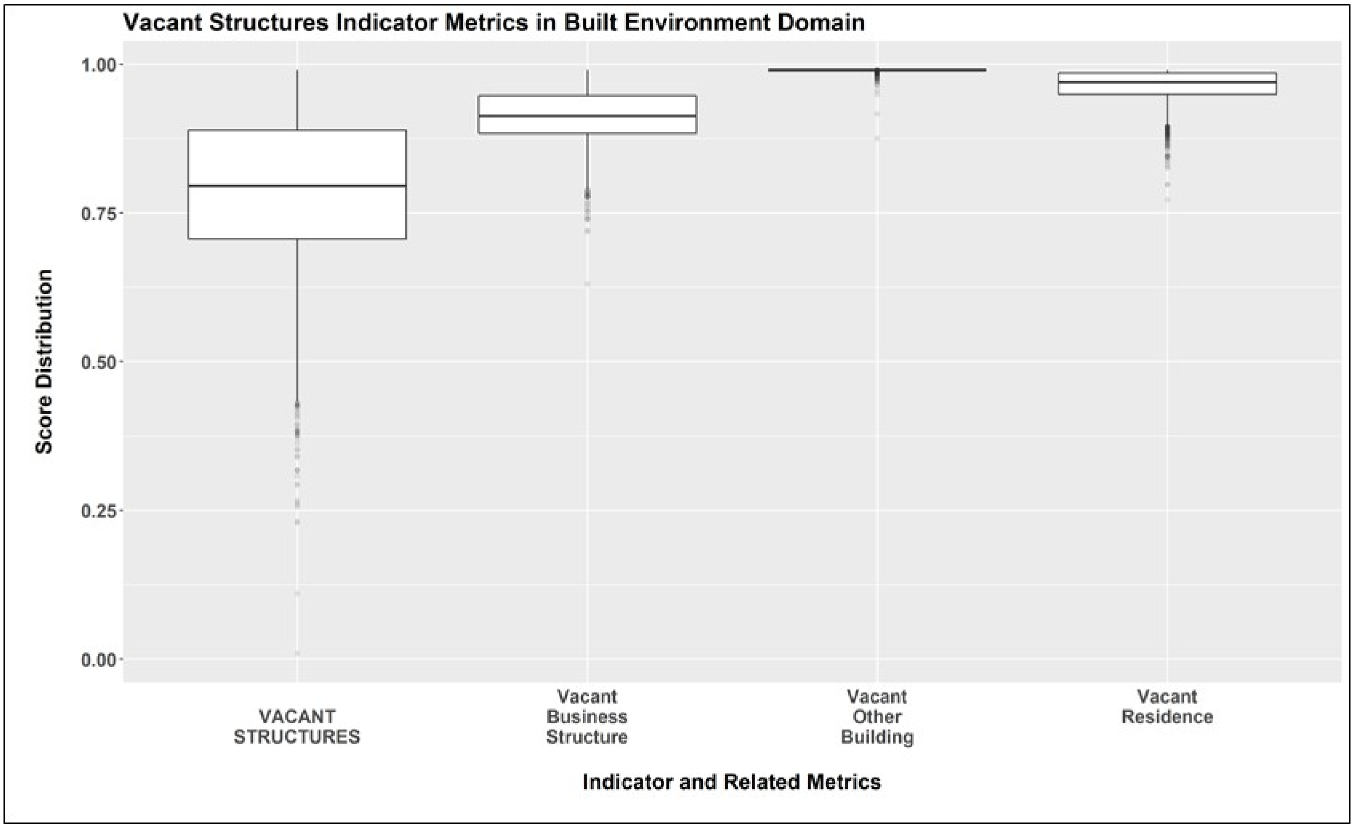
Metric List for Domain: Built Environment – Indicator: Vacant Structures.

Metric Variable: BUS_VAC
Source Measurement: Percent of vacant business structures

Years Available: 2008-2015
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of the number of data records associated with each county divided by total structures.
Missing Data Handling: Zero fill
Data Source: United States Postal Service https://www.huduser.gov/portal/datasets/usps.html

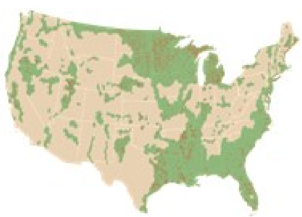
Metric Variable: OTH_VAC
Source Measurement: Percent of vacant structures that are not identified as business or residential
Years Available: 2008-2015
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of the number of data records associated with each county divided by total structures.
Missing Data Handling: Zero fill
Data Source: United States Postal Service https://www.huduser.gov/portal/datasets/usps.html

Metric Variable: RES_VAC
Source Measurement: Percent of vacant residential structures
Years Available: 2008-2015
Smallest Geospatial Level Available: County
Calculation Method: Counts were calculated as the sum of the number of data records associated with each county divided by total structures.
Missing Data Handling: Zero fill
Data Source: United States Postal Service https://www.huduser.gov/portal/datasets/usps.html



Domain: Natural Environment

Indicator: Extent of Ecosystem Types



The extent domain includes the spatial extent or acreage of each ecosystem type that occurs naturally without any significant human intervention

Metric List for Domain: Built Environment – Indicator: Extent of Ecosystem Types

Metric Variable: AGLAND
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent agriculture area calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD categories 81 (Pasture/Hay) and 82 (Cultivated Crops)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: CSTLWATR
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent Marine/Estuarine area calculated using county census tracts (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD category 11 (Open Water)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: FOREST
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent forested area calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD categories 41 (Deciduous Forest), 42 (Evergreen Forest), and 43 (Mixed Forest)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: FRSHWATR
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent area of inland lakes/rivers/streams calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD category 11 (Open Water)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: GRASSLANDS
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent area of grasslands calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD category 71 (Grassland/Herbaceous)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

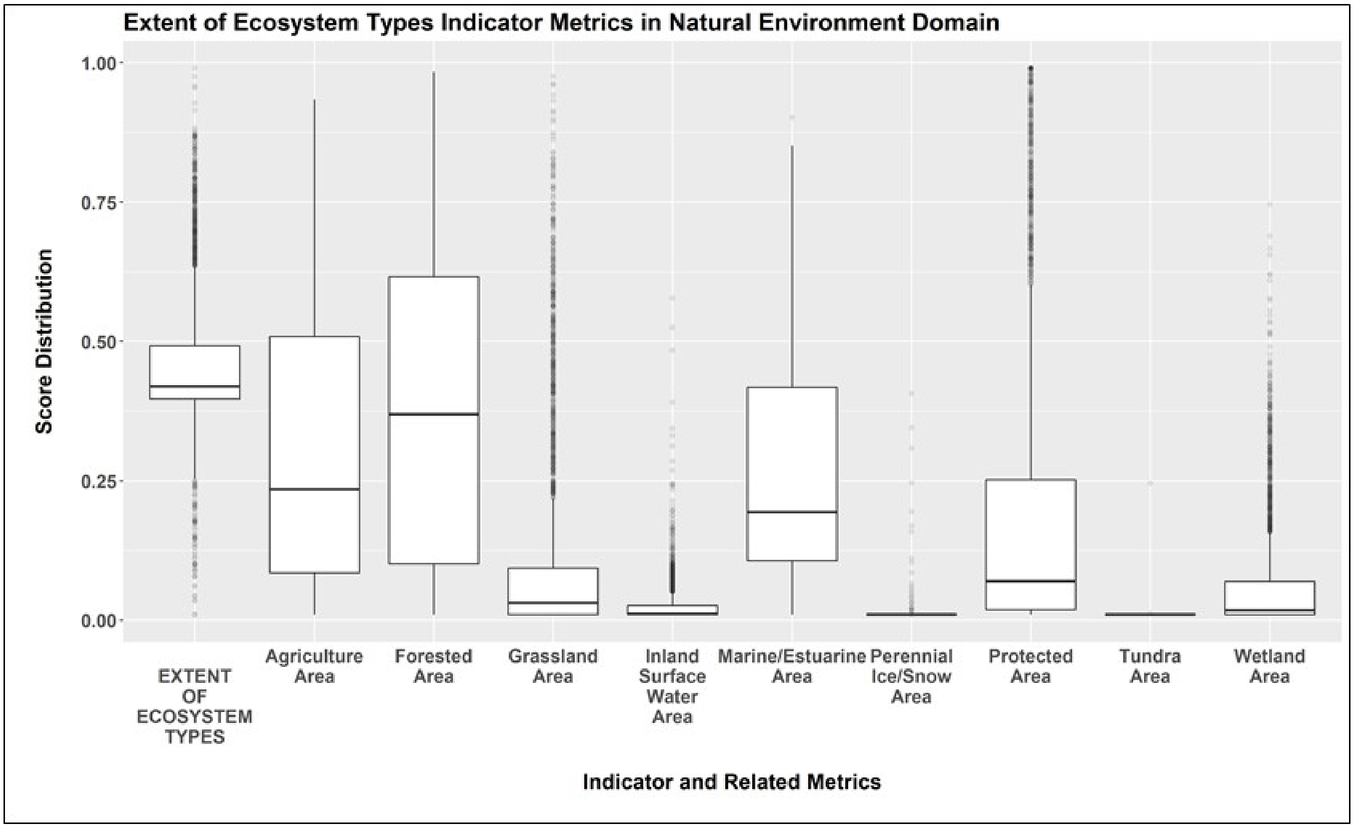
Metric Variable: ICELAND
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent area of ice/snow calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD category 12 (Perennial Ice/Snow)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: PROTAREA
Source Measurement: Percent
Years Available: 2016
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Calculated percent of area classified as conservation lands and preservations including marine protected areas, state recreational areas and urban greenspace using county boundaries (U.S. Census Bureau), ArcMap 10.4, and the Protected Areas Database of the United States (USGS)
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: TUNDRA
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent area of tundra calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD categories 72 (Sedge/Herbaceous), 73 (Lichens), and 74(Moss). Alaska only
Data Source: Environmental protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.mrlc.gov/nlcd2011.php

Metric Variable: WETLANDS
Source Measurement: Percent
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Percent area of wetlands calculated using county boundaries (U.S. Census Bureau), ArcMap 10.4, and 2011 NLCD categories 90 (Woody Wetlands) and 95 (Emergent Herbaceous Wetlands)

Data Source: Environmental protection Agency
Derived Data : https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data : https://www.mrlc.gov/nlcd2011.php



Indicator: Condition

The condition indicator is related to metrics that describe the condition of various natural and managed ecosystems

Metric List for Domain: Built Environment – Indicator: Condition

Metric Variable: BIODIV
Source Measurement: Biodiversity based on avian taxa richness
Years Available: 2015
Smallest Geospatial Level Available: County
Calculation Method: N/A
Missing Data Handling: Null fill
Data Source: Jenkins, C.N., Van Houtan, K.S., Pimm, S.L., Sexton, J.O. 2015. U.S. protected lands mismatch biodiversity priorities. Proceedings of the National Academy of Sciences. 112(16): 5081-5086. http://biodiversitymapping.org/wordpress/index.php/home/

Metric Variable: CLEANAIR
Source Measurement: Percent

Years Available: 2016
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Sum of days AQI rated as Good and Moderate, divided by Total number of days with AQI data
Data Source: U.S. Environmental protection Agency
https://www.epa.gov/outdoor-air-quality-data/air-quality-index-report

Metric Variable: CSTLCOND
Source Measurement: Score
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: NA
Calculation Method: Great Lakes and near-coastal condition assessment score based on NARS costal data. Overall condition scores were calculated for each geo-referenced location as follows based on used for the national assessment (U.S. Environmental Protection Agency. Office of Water and Office of Research and Development. 2015. National Coastal Condition Assessment 2010 (EPA 841-R-15-006). Washington, DC. December 2015). Final scores averaged by summation of all sample points falling within county boundaries using census tracts (U.S. Census Bureau) and ArcMap 10.4
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page Raw Data: https://www.epa.gov/national-aquatic-resource-surveys

Metric Variable: LAKECOND
Source Measurement: Score
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Interpolation
Calculation Method: Inland lakes condition assessment score based on NARS Lake data. Overall condition scores were calculated for each geo-referenced location as follows based on used for the national assessment (U.S. Environmental Protection Agency. 2009. National Lakes Assessment: A Collaborative Survey of the Nation's Lakes. EPA 841-R-09-001. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, D.C.). These values were standardized on a 0 – 1 scale, summed and re-graded based on actual score to highest possible score ratio. Final scores created by distance weighted average of all sample points falling within a 70-mile radius from county centroids using county boundaries (U.S. Census Bureau) and ArcMap 10.4
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.epa.gov/national-aquatic-resource-surveys

Metric Variable: RIVCOND
Source Measurement: Score

Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Interpolation
Calculation Method: Rivers and streams condition assessment score based on NARS Rivers and Streams data. Overall condition scores were calculated for each geo-referenced location as follows based on used for the national assessment (U.S. Environmental Protection Agency. Office of Water and Office of Research and Development. National Rivers and Streams
Assessment 2008-2009: A Collaborative Survey. EPA/841/R-16/007. Washington, DC. March 2016). These values were standardized on a 0 – 1 scale, summed and re-graded based on actual score to highest possible score ratio. Final scores created by distance weighted average of all sample points falling within a 50-mile radius from county centroids using county boundaries
(U.S. Census Bureau) and ArcMap 10.4
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.epa.gov/national-aquatic-resource-surveys

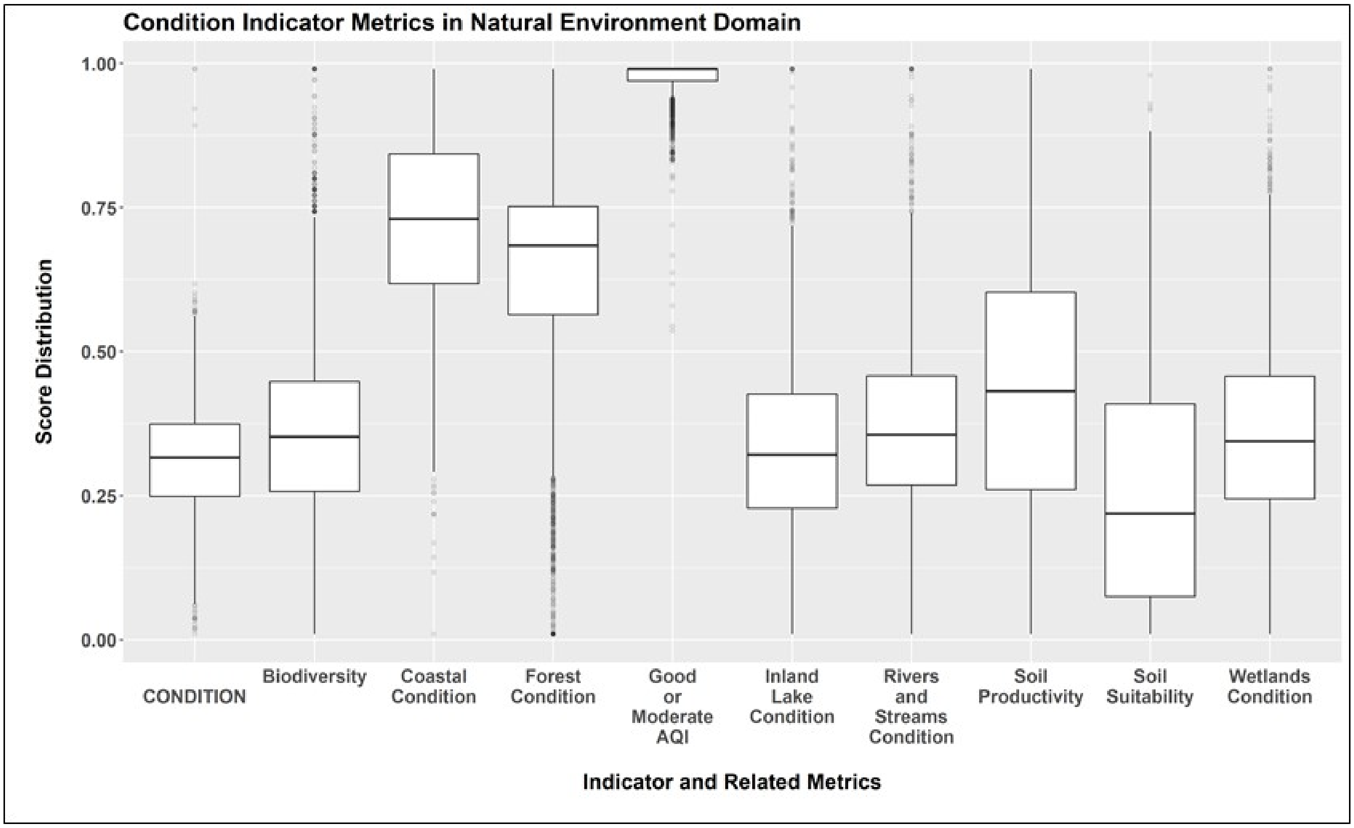
Metric Variable: WLNDCOND
Source Measurement: Score
Years Available: 2011
Smallest Geospatial Level Available: County
Missing Data Handling: Interpolation
Calculation Method: Wetlands condition assessment score based on NARS wetlands data. Overall condition scores were calculated for each geo-referenced location as follows based on used for the national assessment (U.S. Environmental Protection Agency. 2016. National Wetland Condition Assessment: Technical Report. EPA 843-R-15-006. U.S. EPA, Washington, DC). These values were standardized on a 0 – 1 scale, summed and re-graded based on actual score to highest possible score ratio. Final scores created by distance weighted average of all sample points falling within a 100-mile radius from county centroids using county boundaries
(U.S. Census Bureau) and ArcMap 10.4
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.epa.gov/national-aquatic-resource-surveys

Metric Variable: FORCOND Source Measurement: Score
Years Available: 2000 - 2015
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: Forest condition assessment score is a synthesized value created from four Forest Inventory and Analysis Database (FIAB). These are: stand age, basal area of live trees, and disturbance observations (last observation). These three metrics were consistently measures across all years of the assessment and more nationally complete. Disturbance codes were recoded into 3 sub-index values where no disturbance was graded best; pest, disease and anthropogenic disturbance graded most disturb; and remaining disturbance observations (e.g., wildfire, wildlife damage) was considered moderate disturbance. All values were standardized on a 0 – 1 scale, summed and re-graded based on actual score to highest possible score ratio.

Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.fs.fed.us/

Metric Variable: SOILCLASS
Source Measurement: Percent of soil classified as suitable for farming
Years Available: 2016
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: The USDA cropland GIS layer and the classification field from the NCCPI dataset were used to calculate land-area weighted estimates. Census tract results were generated using ArcMAP 10.4. Results were summed to create a final county-level measure.
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/

Metric Variable: SOILPROD
Source Measurement: Average Soil Productivity Index Score
Years Available: 2016
Smallest Geospatial Level Available: County
Missing Data Handling: NULL
Calculation Method: The USDA cropland GIS layer and the productivity index field from the NCCPI dataset were used to calculate land-area weighted estimates. Census tract results were generated using ArcMAP 10.4. Results were averaged to create a final county-level measure.
Source: U.S. Environmental Protection Agency
Derived Data: https://edg.epa.gov/metadata/catalog/main/home.page
Raw Data: https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/



Condition Indicator Metrics in Natural Environment Domain
Score Distribution
1.00
0.75
0.50
0.25
0.00
CONDITION
Biodiversity
Coastal Condition
Forest Condition
Good or Moderate AQI
Inland Lake Condition
Rivers and Streams Condition
Soil Productivity
Soil Suitability
Wetlands Condition
Indicator and Related Metrics

7.2 Appendix B – CRSI and Domain Scores Arranged by EPA region, State and County.

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
National Average	*4.321*	*0.597*	*0.229*	*0.393*	*0.516*	*0.413*
Region 1	**7.530**	**0.660**	**0.240**	**0.492**	**0.599**	**0.445**
Connecticut	**2.661**	**0.654**	**0.395**	**0.520**	**0.547**	**0.398**
Fairfield	1.981	0.621	0.508	0.675	0.494	0.346
Hartford	1.568	0.671	0.650	0.646	0.525	0.311
Litchfield	5.120	0.694	0.224	0.489	0.657	0.431
Middlesex	1.979	0.635	0.420	0.396	0.598	0.439
New Haven	2.145	0.609	0.491	0.659	0.499	0.403
New London	3.612	0.619	0.273	0.587	0.490	0.433
Tolland	2.314	0.721	0.306	0.341	0.551	0.403
Windham	2.568	0.663	0.289	0.370	0.561	0.420
Maine	**12.708**	**0.677**	**0.115**	**0.499**	**0.565**	**0.484**
Androscoggin	4.158	0.635	0.174	0.424	0.565	0.365
Aroostook	14.019	0.687	0.101	0.744	0.546	0.413
Cumberland	5.505	0.718	0.298	0.671	0.615	0.525
Franklin	9.593	0.678	0.094	0.490	0.502	0.421
Hancock	35.399	0.670	0.038	0.543	0.559	0.603
Kennebec	6.912	0.653	0.145	0.533	0.581	0.395
Knox	11.639	0.531	0.076	0.344	0.621	0.617
Lincoln	13.316	0.772	0.080	0.309	0.613	0.548
Oxford	7.163	0.644	0.116	0.505	0.505	0.388
Penobscot	13.514	0.652	0.104	0.786	0.565	0.390
Piscataquis	10.370	0.673	0.075	0.342	0.524	0.491
Sagadahoc	7.603	0.722	0.126	0.304	0.615	0.534
Somerset	15.131	0.759	0.081	0.542	0.523	0.463
Waldo	28.446	0.684	0.032	0.410	0.538	0.486
Washington	14.359	0.672	0.092	0.483	0.628	0.588
York	6.200	0.685	0.201	0.553	0.547	0.516
Massachusetts	**5.041**	**0.602**	**0.361**	**0.557**	**0.601**	**0.447**
Barnstable	6.836	0.627	0.197	0.585	0.580	0.591
Berkshire	5.571	0.633	0.202	0.552	0.671	0.402
Bristol	2.111	0.643	0.523	0.572	0.552	0.451
Dukes	21.827	0.538	0.045	0.289	0.811	0.595
Essex	2.504	0.642	0.537	0.671	0.565	0.487

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Franklin	8.874	0.701	0.147	0.542	0.707	0.419
Hampden	1.666	0.606	0.576	0.649	0.517	0.340
Hampshire	3.205	0.523	0.197	0.429	0.563	0.389
Middlesex	2.200	0.660	0.591	0.819	0.585	0.259
Nantucket	6.526	0.323	0.060	0.220	0.572	0.609
Norfolk	2.315	0.621	0.497	0.633	0.618	0.387
Plymouth	2.847	0.624	0.469	0.614	0.598	0.542
Suffolk	1.495	0.648	0.465	0.417	0.465	0.426
Worcester	2.596	0.646	0.550	0.804	0.604	0.359
New Hampshire	**6.561**	**0.670**	**0.229**	**0.519**	**0.596**	**0.421**
Belknap	4.773	0.656	0.151	0.350	0.621	0.385
Carroll	5.716	0.668	0.169	0.441	0.599	0.445
Cheshire	7.642	0.620	0.108	0.457	0.574	0.400
Coos	12.682	0.699	0.112	0.536	0.640	0.549
Grafton	11.672	0.638	0.129	0.785	0.571	0.468
Hillsborough	2.559	0.722	0.461	0.631	0.574	0.334
Merrimack	10.688	0.718	0.149	0.667	0.728	0.410
Rockingham	2.066	0.691	0.555	0.578	0.554	0.420
Strafford	1.916	0.626	0.338	0.380	0.505	0.419
Sullivan	5.900	0.665	0.120	0.363	0.594	0.379
Rhode Island	**2.479**	**0.627**	**0.372**	**0.302**	**0.586**	**0.511**
Bristol	1.015	0.522	0.385	0.110	0.584	0.531
Kent	1.275	0.708	0.510	0.240	0.605	0.443
Newport	4.139	0.669	0.207	0.232	0.551	0.643
Providence	1.642	0.639	0.510	0.535	0.551	0.326
Washington	4.322	0.595	0.248	0.391	0.637	0.614
Vermont	**9.382**	**0.708**	**0.135**	**0.450**	**0.671**	**0.417**
Addison	17.298	0.825	0.089	0.473	0.712	0.490
Bennington	7.519	0.763	0.154	0.435	0.613	0.469
Caledonia	9.771	0.686	0.115	0.401	0.815	0.396
Chittenden	5.495	0.754	0.261	0.661	0.604	0.387
Essex	12.333	0.780	0.074	0.327	0.468	0.560
Franklin	3.660	0.649	0.242	0.427	0.651	0.386
Grand Isle	12.838	0.677	0.063	0.334	0.714	0.365
Lamoille	10.944	0.619	0.080	0.389	0.665	0.438
Orange	6.894	0.751	0.140	0.400	0.689	0.351
Orleans	7.130	0.732	0.185	0.436	0.793	0.439
Rutland	11.762	0.595	0.090	0.520	0.662	0.441

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Washington	9.925	0.681	0.110	0.469	0.720	0.381
Windham	10.089	0.753	0.104	0.467	0.638	0.364
Windsor	5.687	0.640	0.188	0.558	0.651	0.367

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 2	**3.839**	**0.658**	**0.308**	**0.469**	**0.520**	**0.385**
New Jersey	**1.762**	**0.639**	**0.488**	**0.471**	**0.518**	**0.397**
Atlantic	1.964	0.633	0.477	0.520	0.431	0.507
Bergen	0.928	0.610	0.582	0.464	0.586	0.202
Burlington	2.458	0.675	0.538	0.567	0.547	0.558
Camden	1.032	0.606	0.532	0.444	0.506	0.296
Cape May	2.180	0.609	0.382	0.401	0.462	0.565
Cumberland	2.657	0.598	0.313	0.437	0.444	0.549
Essex	0.637	0.618	0.519	0.467	0.531	0.100
Gloucester	1.137	0.571	0.553	0.453	0.489	0.379
Hudson	0.659	0.618	0.525	0.402	0.465	0.233
Hunterdon	2.868	0.644	0.386	0.512	0.598	0.480
Mercer	1.269	0.599	0.496	0.448	0.492	0.362
Middlesex	1.638	0.646	0.522	0.601	0.561	0.253
Monmouth	1.618	0.627	0.728	0.615	0.534	0.485
Morris	2.197	0.672	0.511	0.524	0.595	0.449
Ocean	1.517	0.675	0.806	0.596	0.448	0.546
Passaic	1.447	0.642	0.494	0.384	0.522	0.432
Salem	3.527	0.708	0.209	0.338	0.459	0.503
Somerset	1.457	0.679	0.585	0.486	0.573	0.339
Sussex	2.147	0.652	0.406	0.405	0.563	0.468
Union	0.878	0.652	0.337	0.388	0.561	0.129
Warren	2.795	0.679	0.339	0.441	0.513	0.493
New York	**4.542**	**0.665**	**0.248**	**0.469**	**0.521**	**0.381**
Albany	2.354	0.693	0.455	0.542	0.639	0.343
Allegany	4.919	0.657	0.118	0.482	0.385	0.343
Bronx	0.121	0.668	0.529	0.297	0.409	0.203
Broome	2.075	0.689	0.381	0.505	0.497	0.335
Cattaraugus	5.133	0.657	0.186	0.560	0.421	0.460
Cayuga	5.792	0.637	0.139	0.464	0.571	0.368
Chautauqua	5.625	0.655	0.152	0.567	0.414	0.399
Chemung	1.694	0.596	0.204	0.339	0.472	0.304
Chenango	3.796	0.699	0.160	0.393	0.474	0.362

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Clinton	7.373	0.699	0.154	0.587	0.534	0.412
Columbia	5.134	0.644	0.155	0.412	0.603	0.387
Cortland	3.287	0.633	0.146	0.331	0.527	0.341
Delaware	4.208	0.703	0.210	0.519	0.485	0.375
Dutchess	2.064	0.638	0.521	0.612	0.587	0.366
Erie	2.418	0.656	0.463	0.713	0.550	0.296
Essex	9.274	0.677	0.126	0.530	0.561	0.493
Franklin	8.313	0.721	0.138	0.440	0.531	0.560
Fulton	2.821	0.597	0.140	0.282	0.464	0.406
Genesee	3.131	0.617	0.205	0.377	0.544	0.393
Greene	3.807	0.659	0.188	0.465	0.495	0.356
Hamilton	16.706	0.723	0.062	0.354	0.556	0.565
Herkimer	7.873	0.643	0.112	0.503	0.422	0.490
Jefferson	8.873	0.710	0.147	0.672	0.485	0.446
Kings	0.889	0.664	0.366	0.310	0.502	0.276
Lewis	9.628	0.666	0.095	0.463	0.516	0.456
Livingston	8.946	0.717	0.116	0.480	0.539	0.449
Madison	4.735	0.585	0.144	0.420	0.538	0.403
Monroe	2.749	0.652	0.375	0.623	0.519	0.364
Montgomery	2.282	0.722	0.143	0.260	0.492	0.322
Nassau	2.935	0.598	0.351	0.564	0.703	0.342
New York	0.463	0.641	0.569	0.376	0.460	0.206
Niagara	2.781	0.680	0.279	0.432	0.481	0.425
Oneida	4.985	0.646	0.235	0.676	0.525	0.398
Onondaga	2.225	0.655	0.458	0.590	0.567	0.353
Ontario	6.110	0.641	0.159	0.528	0.555	0.413
Orange	2.310	0.623	0.520	0.704	0.591	0.362
Orleans	3.544	0.722	0.162	0.325	0.443	0.431
Oswego	4.458	0.684	0.166	0.565	0.389	0.330
Otsego	4.762	0.682	0.149	0.441	0.528	0.337
Putnam	2.320	0.657	0.411	0.403	0.633	0.463
Queens	1.885	0.546	0.336	0.467	0.578	0.318
Rensselaer	2.077	0.641	0.371	0.478	0.531	0.359
Richmond	1.146	0.562	0.508	0.314	0.579	0.431
Rockland	1.073	0.615	0.556	0.345	0.618	0.340
Saratoga	2.038	0.684	0.473	0.535	0.566	0.355
Schenectady	0.487	0.654	0.390	0.218	0.528	0.274
Schoharie	6.217	0.742	0.077	0.320	0.525	0.310
Schuyler	6.908	0.784	0.099	0.312	0.545	0.394
Seneca	4.455	0.670	0.134	0.328	0.492	0.427
St. Lawrence	10.729	0.635	0.117	0.691	0.453	0.508
Steuben	11.086	0.719	0.105	0.707	0.445	0.353

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Suffolk	4.063	0.606	0.383	0.738	0.683	0.512
Sullivan	4.577	0.611	0.183	0.553	0.512	0.361
Tioga	1.693	0.765	0.266	0.343	0.450	0.321
Tompkins	6.092	0.700	0.111	0.457	0.459	0.343
Ulster	5.558	0.648	0.219	0.636	0.542	0.455
Warren	6.898	0.675	0.139	0.435	0.599	0.439
Washington	4.339	0.684	0.147	0.408	0.484	0.365
Wayne	4.729	0.701	0.132	0.403	0.466	0.365
Westchester	1.431	0.618	0.591	0.544	0.589	0.310
Wyoming	5.565	0.724	0.122	0.406	0.504	0.353
Yates	5.649	0.729	0.110	0.322	0.542	0.376

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 3	**2.934**	**0.571**	**0.272**	**0.382**	**0.512**	**0.378**
Delaware	**2.443**	**0.606**	**0.474**	**0.586**	**0.472**	**0.547**
Kent	2.816	0.638	0.434	0.566	0.463	0.609
New Castle	1.647	0.647	0.609	0.546	0.520	0.437
Sussex	2.867	0.534	0.380	0.646	0.434	0.596
District of Columbia	**0.501**	**0.610**	**0.676**	**0.402**	**0.506**	**0.200**
District of Columbia	0.501	0.610	0.676	0.402	0.506	0.200
Maryland	**3.367**	**0.622**	**0.366**	**0.494**	**0.518**	**0.463**
Allegany	2.268	0.604	0.277	0.421	0.441	0.429
Anne Arundel	1.542	0.642	0.675	0.539	0.553	0.446
Baltimore	1.796	0.571	0.494	0.567	0.585	0.363
Baltimore city	0.185	0.611	0.594	0.393	0.381	0.156
Calvert	2.931	0.664	0.317	0.440	0.541	0.472
Caroline	5.656	0.626	0.155	0.389	0.494	0.568
Carroll	3.840	0.707	0.296	0.501	0.620	0.429
Cecil	1.785	0.567	0.432	0.522	0.398	0.483
Charles	2.643	0.674	0.484	0.562	0.565	0.524
Dorchester	4.615	0.588	0.172	0.373	0.447	0.601
Frederick	2.235	0.662	0.529	0.632	0.603	0.373
Garrett	6.420	0.585	0.140	0.583	0.497	0.409
Harford	2.158	0.626	0.465	0.513	0.531	0.485
Howard	1.295	0.628	0.565	0.399	0.627	0.355
Kent	4.053	0.522	0.190	0.428	0.492	0.555

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Montgomery	1.518	0.651	0.590	0.530	0.569	0.344
Prince George's	1.496	0.653	0.704	0.565	0.610	0.368
Queen Anne's	6.294	0.587	0.173	0.531	0.581	0.529
Somerset	7.335	0.676	0.124	0.407	0.390	0.609
St. Mary's	3.903	0.703	0.303	0.521	0.483	0.547
Talbot	4.838	0.594	0.197	0.422	0.570	0.555
Washington	1.960	0.627	0.470	0.549	0.497	0.419
Wicomico	3.234	0.583	0.281	0.498	0.506	0.505
Worcester	6.816	0.588	0.160	0.559	0.453	0.598
Pennsylvania	**4.369**	**0.667**	**0.257**	**0.481**	**0.503**	**0.383**
Adams	3.414	0.662	0.262	0.530	0.508	0.382
Allegheny	1.086	0.593	0.705	0.706	0.529	0.151
Armstrong	3.389	0.659	0.188	0.487	0.480	0.295
Beaver	1.460	0.629	0.360	0.430	0.497	0.290
Bedford	8.398	0.702	0.099	0.438	0.511	0.410
Berks	2.960	0.646	0.367	0.666	0.513	0.365
Blair	4.192	0.652	0.231	0.509	0.537	0.437
Bradford	6.884	0.768	0.129	0.512	0.473	0.349
Bucks	2.432	0.648	0.521	0.724	0.634	0.318
Butler	1.886	0.645	0.413	0.476	0.587	0.320
Cambria	6.761	0.677	0.165	0.580	0.587	0.388
Cameron	7.320	0.848	0.107	0.214	0.467	0.584
Carbon	4.551	0.677	0.164	0.401	0.515	0.416
Centre	4.872	0.588	0.201	0.612	0.497	0.430
Chester	2.222	0.637	0.480	0.601	0.544	0.409
Clarion	7.152	0.758	0.126	0.412	0.553	0.409
Clearfield	6.458	0.673	0.142	0.542	0.495	0.383
Clinton	8.577	0.749	0.132	0.478	0.491	0.518
Columbia	3.198	0.651	0.193	0.398	0.491	0.375
Crawford	4.921	0.695	0.173	0.461	0.462	0.443
Cumberland	1.718	0.619	0.508	0.533	0.549	0.370
Dauphin	1.583	0.603	0.534	0.524	0.558	0.370
Delaware	0.804	0.566	0.485	0.388	0.526	0.252
Elk	7.984	0.603	0.110	0.354	0.562	0.572
Erie	2.922	0.614	0.303	0.596	0.504	0.351
Fayette	3.097	0.607	0.226	0.532	0.445	0.352
Forest	8.283	0.914	0.097	0.263	0.369	0.590
Franklin	2.850	0.576	0.303	0.575	0.505	0.396
Fulton	5.826	0.688	0.090	0.357	0.427	0.394
Greene	2.410	0.619	0.144	0.409	0.386	0.290

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Huntingdon	10.034	0.683	0.102	0.478	0.525	0.486
Indiana	3.693	0.628	0.180	0.565	0.386	0.323
Jefferson	5.413	0.743	0.156	0.427	0.512	0.403
Juniata	4.518	0.612	0.144	0.365	0.525	0.431
Lackawanna	1.800	0.668	0.418	0.439	0.546	0.359
Lancaster	3.078	0.579	0.389	0.741	0.578	0.391
Lawrence	1.916	0.624	0.225	0.283	0.553	0.346
Lebanon	1.571	0.598	0.402	0.380	0.550	0.391
Lehigh	1.619	0.645	0.505	0.556	0.513	0.316
Luzerne	2.696	0.647	0.405	0.650	0.522	0.378
Lycoming	7.597	0.726	0.167	0.599	0.524	0.453
McKean	2.861	0.719	0.213	0.327	0.439	0.453
Mercer	3.640	0.739	0.238	0.448	0.521	0.389
Mifflin	4.004	0.624	0.161	0.332	0.512	0.466
Monroe	2.512	0.688	0.307	0.492	0.422	0.398
Montgomery	1.759	0.651	0.521	0.631	0.604	0.220
Montour	2.745	0.628	0.157	0.324	0.481	0.358
Northampton	1.531	0.650	0.500	0.522	0.509	0.320
Northumberland	3.055	0.640	0.189	0.418	0.475	0.348
Perry	8.674	0.632	0.096	0.420	0.595	0.418
Philadelphia	0.395	0.560	0.507	0.530	0.403	0.063
Pike	3.238	0.672	0.189	0.402	0.355	0.464
Potter	9.589	0.784	0.091	0.427	0.454	0.440
Schuylkill	4.131	0.652	0.244	0.617	0.508	0.365
Snyder	4.609	0.700	0.150	0.414	0.476	0.385
Somerset	8.679	0.677	0.124	0.638	0.493	0.374
Sullivan	6.896	0.806	0.102	0.349	0.470	0.413
Susquehanna	5.903	0.640	0.116	0.458	0.461	0.384
Tioga	10.408	0.713	0.087	0.558	0.427	0.383
Union	4.643	0.682	0.162	0.374	0.516	0.444
Venango	4.995	0.681	0.155	0.381	0.486	0.473
Warren	9.187	0.740	0.084	0.361	0.444	0.490
Washington	2.376	0.670	0.341	0.544	0.548	0.277
Wayne	6.147	0.658	0.152	0.486	0.588	0.393
Westmoreland	1.320	0.577	0.546	0.506	0.588	0.303
Wyoming	4.022	0.765	0.206	0.426	0.501	0.391
York	1.879	0.596	0.507	0.666	0.502	0.340
Virginia	**2.484**	**0.520**	**0.297**	**0.331**	**0.548**	**0.378**
Accomack	6.907	0.562	0.162	0.504	0.534	0.650
Albemarle	3.807	0.651	0.263	0.563	0.540	0.398

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Alexandria city	-0.060	0.626	0.607	0.255	0.495	0.117
Alleghany	3.302	0.492	0.198	0.349	0.657	0.451
Amelia	6.454	0.570	0.111	0.331	0.651	0.445
Amherst	2.663	0.486	0.256	0.447	0.602	0.418
Appomattox	5.256	0.572	0.132	0.343	0.628	0.433
Arlington	-0.074	0.655	0.538	0.257	0.491	0.118
Augusta	4.228	0.478	0.208	0.558	0.574	0.498
Bath	3.679	0.386	0.181	0.357	0.726	0.550
Bedford	1.132	0.169	0.234	0.541	0.601	0.384
Bland	2.727	0.246	0.082	0.291	0.485	0.480
Botetourt	1.764	0.239	0.224	0.480	0.756	0.361
Bristol city	-0.064	0.160	0.546	0.119	0.546	0.159
Brunswick	4.723	0.512	0.115	0.361	0.532	0.427
Buchanan	1.789	0.540	0.150	0.402	0.394	0.265
Buckingham	2.982	0.558	0.170	0.360	0.502	0.391
Buena Vista city	-0.362	0.475	0.395	0.095	0.424	0.250
Campbell	2.861	0.440	0.203	0.451	0.652	0.340
Caroline	6.744	0.611	0.131	0.474	0.503	0.487
Carroll	2.626	0.450	0.140	0.396	0.504	0.312
Charles City	6.855	0.583	0.101	0.329	0.524	0.520
Charlotte	6.880	0.565	0.079	0.341	0.593	0.362
Charlottesville city	-0.497	0.583	0.515	0.164	0.539	0.026
Chesapeake city	0.962	0.524	0.714	0.398	0.544	0.481
Chesterfield	1.438	0.600	0.626	0.510	0.581	0.407
Clarke	6.612	0.647	0.106	0.320	0.646	0.389
Colonial Heights city	-0.001	0.650	0.655	0.158	0.593	0.169
Covington city	-0.269	0.272	0.309	0.010	0.590	0.207
Craig	3.813	0.598	0.159	0.258	0.555	0.502
Culpeper	3.173	0.718	0.282	0.372	0.656	0.393
Cumberland	7.993	0.715	0.096	0.323	0.538	0.471
Danville city	-0.554	0.417	0.458	0.040	0.416	0.192
Dickenson	2.287	0.323	0.129	0.369	0.434	0.437
Dinwiddie	4.137	0.486	0.149	0.392	0.531	0.479
Emporia city	-0.055	0.576	0.528	0.146	0.463	0.265
Essex	3.365	0.481	0.216	0.343	0.684	0.508
Fairfax	1.311	0.669	0.569	0.474	0.557	0.308
Fairfax city	0.691	0.693	0.485	0.175	0.842	0.148
Falls Church city	1.224	0.842	0.320	0.152	0.766	0.225
Fauquier	4.935	0.646	0.243	0.546	0.678	0.436
Floyd	2.192	0.414	0.128	0.336	0.552	0.285
Fluvanna	4.426	0.740	0.158	0.397	0.511	0.359

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Franklin	1.926	0.401	0.194	0.422	0.514	0.325
Franklin city	-0.031	0.656	0.331	0.146	0.399	0.330
Frederick	1.359	0.673	0.487	0.451	0.522	0.308
Fredericksburg city	-0.081	0.755	0.476	0.144	0.578	0.176
Galax city	-0.796	0.479	0.272	0.114	0.391	0.193
Giles	4.168	0.380	0.113	0.342	0.576	0.485
Gloucester	2.925	0.473	0.273	0.347	0.678	0.582
Goochland	2.854	0.603	0.215	0.422	0.525	0.350
Grayson	1.800	0.288	0.124	0.363	0.463	0.365
Greene	3.695	0.643	0.155	0.340	0.536	0.378
Greensville	2.068	0.558	0.122	0.333	0.251	0.436
Halifax	2.942	0.478	0.154	0.402	0.504	0.361
Hampton city	1.103	0.572	0.576	0.285	0.483	0.570
Hanover	2.160	0.567	0.399	0.474	0.677	0.376
Harrisonburg city	-0.117	0.716	0.391	0.266	0.448	0.142
Henrico	0.839	0.588	0.656	0.374	0.588	0.319
Henry	0.720	0.397	0.370	0.369	0.452	0.325
Highland	3.465	0.297	0.113	0.266	0.695	0.507
Hopewell city	-0.111	0.442	0.561	0.136	0.462	0.240
Isle of Wight	2.488	0.625	0.348	0.390	0.585	0.487
James City	1.604	0.653	0.519	0.327	0.539	0.546
King and Queen	7.095	0.586	0.107	0.306	0.569	0.551
King George	4.097	0.861	0.252	0.418	0.464	0.478
King William	12.156	0.771	0.105	0.397	0.648	0.541
Lancaster	3.122	0.545	0.301	0.322	0.711	0.597
Lee	1.323	0.293	0.141	0.370	0.418	0.338
Lexington city	-0.524	0.430	0.240	0.067	0.681	0.078
Loudoun	1.462	0.690	0.704	0.517	0.618	0.365
Louisa	4.414	0.599	0.156	0.476	0.501	0.366
Lunenburg	3.797	0.517	0.113	0.282	0.533	0.420
Lynchburg city	-0.214	0.521	0.507	0.227	0.436	0.134
Madison	4.244	0.432	0.136	0.350	0.657	0.451
Manassas city	0.427	0.597	0.435	0.236	0.712	0.115
Manassas Park city	-0.299	0.603	0.395	0.147	0.584	0.108
Martinsville city	-0.262	0.275	0.460	0.055	0.519	0.160
Mathews	4.484	0.550	0.232	0.264	0.702	0.735
Mecklenburg	6.109	0.554	0.116	0.410	0.597	0.411
Middlesex	4.145	0.640	0.253	0.317	0.632	0.631
Montgomery	1.268	0.334	0.288	0.443	0.487	0.390
Nelson	2.723	0.414	0.150	0.417	0.485	0.375
New Kent	5.284	0.550	0.164	0.422	0.622	0.499

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Newport News city	1.100	0.558	0.558	0.311	0.461	0.556
Norfolk city	0.597	0.536	0.523	0.294	0.433	0.386
Northampton	4.290	0.545	0.209	0.335	0.561	0.673
Northumberland	5.351	0.754	0.214	0.355	0.612	0.557
Norton city	-0.066	0.117	0.551	0.026	0.526	0.240
Nottoway	2.985	0.426	0.128	0.298	0.530	0.431
Orange	4.099	0.651	0.158	0.393	0.502	0.392
Page	4.828	0.413	0.125	0.399	0.589	0.505
Patrick	2.045	0.415	0.156	0.369	0.522	0.309
Petersburg city	0.024	0.599	0.517	0.177	0.417	0.296
Pittsylvania	3.622	0.474	0.198	0.540	0.530	0.421
Poquoson city	2.187	0.590	0.253	0.165	0.527	0.596
Portsmouth city	0.210	0.544	0.668	0.238	0.487	0.271
Powhatan	8.299	0.800	0.140	0.390	0.650	0.461
Prince Edward	5.321	0.562	0.109	0.363	0.562	0.391
Prince George	2.580	0.551	0.319	0.445	0.482	0.554
Prince William	1.351	0.634	0.600	0.472	0.597	0.345
Pulaski	2.129	0.408	0.189	0.369	0.518	0.401
Radford city	-0.484	0.478	0.331	0.133	0.334	0.266
Rappahannock	3.657	0.438	0.132	0.346	0.561	0.439
Richmond	2.697	0.539	0.238	0.341	0.550	0.489
Richmond city	-0.194	0.591	0.551	0.245	0.463	0.105
Roanoke	0.823	0.410	0.468	0.376	0.600	0.308
Roanoke city	-0.119	0.413	0.460	0.210	0.536	0.104
Rockbridge	2.397	0.269	0.158	0.446	0.572	0.444
Rockingham	4.678	0.546	0.216	0.616	0.555	0.454
Russell	0.939	0.141	0.124	0.398	0.438	0.368
Salem city	-0.143	0.423	0.451	0.146	0.598	0.116
Scott	0.986	0.212	0.139	0.381	0.400	0.346
Shenandoah	4.175	0.600	0.196	0.456	0.599	0.394
Smyth	1.829	0.236	0.159	0.387	0.544	0.461
Southampton	7.948	0.609	0.110	0.432	0.568	0.474
Spotsylvania	1.318	0.679	0.517	0.382	0.539	0.377
Stafford	1.503	0.674	0.554	0.393	0.564	0.439
Staunton city	0.313	0.648	0.356	0.156	0.569	0.260
Suffolk city	1.440	0.574	0.557	0.494	0.489	0.454
Surry	2.349	0.556	0.242	0.305	0.494	0.504
Sussex	4.987	0.503	0.110	0.355	0.496	0.476
Tazewell	1.401	0.293	0.164	0.409	0.457	0.324
Virginia Beach city	1.389	0.507	0.468	0.377	0.509	0.520
Warren	1.510	0.616	0.363	0.333	0.577	0.354

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Washington	0.762	0.183	0.277	0.443	0.475	0.422
Waynesboro city	-0.202	0.451	0.456	0.133	0.514	0.175
Westmoreland	3.181	0.660	0.251	0.297	0.651	0.463
Williamsburg city	1.001	0.873	0.387	0.218	0.491	0.365
Winchester city	-0.502	0.583	0.383	0.148	0.555	0.076
Wise	1.474	0.299	0.161	0.419	0.415	0.351
Wythe	2.792	0.355	0.153	0.375	0.580	0.431
York	1.666	0.576	0.590	0.326	0.595	0.679
West Virginia	**2.158**	**0.555**	**0.168**	**0.324**	**0.435**	**0.328**
Barbour	3.176	0.616	0.090	0.327	0.445	0.293
Berkeley	0.848	0.633	0.482	0.349	0.431	0.353
Boone	1.225	0.573	0.127	0.276	0.436	0.276
Braxton	6.851	0.615	0.075	0.337	0.442	0.435
Brooke	-0.014	0.592	0.373	0.251	0.380	0.235
Cabell	1.109	0.582	0.243	0.295	0.449	0.323
Calhoun	0.607	0.433	0.135	0.267	0.370	0.305
Clay	0.735	0.402	0.119	0.292	0.301	0.345
Doddridge	1.016	0.616	0.091	0.206	0.438	0.302
Fayette	6.513	0.584	0.112	0.461	0.551	0.380
Gilmer	1.325	0.750	0.077	0.222	0.364	0.337
Grant	4.007	0.552	0.126	0.326	0.539	0.403
Greenbrier	2.565	0.233	0.102	0.394	0.554	0.402
Hampshire	4.280	0.610	0.105	0.417	0.373	0.364
Hancock	-0.305	0.513	0.354	0.168	0.359	0.259
Hardy	2.341	0.451	0.153	0.384	0.420	0.384
Harrison	2.283	0.590	0.206	0.417	0.544	0.251
Jackson	1.891	0.560	0.150	0.365	0.439	0.272
Jefferson	1.420	0.602	0.332	0.401	0.449	0.339
Kanawha	2.625	0.633	0.224	0.475	0.519	0.260
Lewis	2.937	0.658	0.111	0.282	0.443	0.354
Lincoln	0.397	0.554	0.145	0.316	0.322	0.256
Logan	1.297	0.543	0.120	0.373	0.363	0.236
Marion	1.699	0.611	0.222	0.351	0.506	0.280
Marshall	1.271	0.642	0.206	0.358	0.412	0.261
Mason	1.484	0.584	0.181	0.360	0.368	0.316
McDowell	0.548	0.507	0.224	0.330	0.335	0.286
Mercer	1.260	0.354	0.144	0.345	0.458	0.282
Mineral	2.224	0.585	0.153	0.350	0.377	0.369
Mingo	1.009	0.578	0.143	0.371	0.296	0.276
Monongalia	0.729	0.546	0.399	0.385	0.404	0.289

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Monroe	2.833	0.306	0.086	0.317	0.557	0.347
Morgan	1.214	0.479	0.105	0.270	0.362	0.340
Nicholas	3.237	0.510	0.112	0.357	0.407	0.391
Ohio	0.109	0.608	0.394	0.199	0.569	0.172
Pendleton	2.948	0.547	0.177	0.332	0.463	0.472
Pleasants	0.450	0.759	0.154	0.273	0.359	0.267
Pocahontas	5.274	0.424	0.108	0.309	0.588	0.554
Preston	5.307	0.648	0.129	0.460	0.529	0.321
Putnam	2.156	0.594	0.274	0.413	0.573	0.313
Raleigh	2.740	0.502	0.174	0.408	0.530	0.334
Randolph	4.628	0.426	0.103	0.387	0.519	0.433
Ritchie	0.811	0.633	0.097	0.246	0.381	0.293
Roane	2.218	0.597	0.107	0.289	0.390	0.351
Summers	3.745	0.483	0.077	0.230	0.482	0.422
Taylor	1.725	0.536	0.107	0.198	0.530	0.317
Tucker	9.580	0.641	0.066	0.320	0.486	0.476
Tyler	1.180	0.684	0.106	0.223	0.421	0.309
Upshur	4.094	0.547	0.106	0.355	0.546	0.313
Wayne	2.243	0.602	0.169	0.395	0.365	0.350
Webster	0.446	0.474	0.137	0.249	0.222	0.418
Wetzel	0.812	0.579	0.147	0.267	0.397	0.291
Wirt	-0.412	0.455	0.116	0.240	0.296	0.274
Wood	1.174	0.650	0.256	0.340	0.477	0.251
Wyoming	0.820	0.539	0.217	0.317	0.369	0.309

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 4	**1.443**	**0.443**	**0.255**	**0.342**	**0.414**	**0.403**
Alabama	**1.065**	**0.335**	**0.296**	**0.408**	**0.385**	**0.397**
Autauga	1.670	0.368	0.238	0.423	0.477	0.412
Baldwin	1.731	0.338	0.418	0.772	0.446	0.490
Barbour	2.961	0.364	0.093	0.372	0.337	0.449
Bibb	0.836	0.256	0.246	0.355	0.403	0.433
Blount	0.715	0.207	0.244	0.412	0.456	0.345
Bullock	0.666	0.161	0.085	0.266	0.332	0.403
Butler	0.867	0.309	0.276	0.356	0.405	0.419
Calhoun	0.327	0.225	0.669	0.456	0.399	0.396
Chambers	0.565	0.245	0.140	0.308	0.303	0.369
Cherokee	0.769	0.416	0.293	0.351	0.379	0.351

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Chilton	2.143	0.319	0.158	0.421	0.485	0.401
Choctaw	0.363	0.470	0.274	0.262	0.243	0.421
Clarke	0.723	0.345	0.318	0.400	0.359	0.364
Clay	1.083	0.195	0.129	0.349	0.372	0.430
Cleburne	1.120	0.287	0.131	0.308	0.309	0.440
Coffee	2.173	0.507	0.259	0.406	0.476	0.445
Colbert	1.142	0.224	0.262	0.432	0.535	0.462
Conecuh	0.317	0.328	0.275	0.318	0.172	0.440
Coosa	0.814	0.210	0.114	0.344	0.263	0.409
Covington	1.469	0.366	0.298	0.404	0.510	0.454
Crenshaw	1.297	0.450	0.205	0.349	0.380	0.371
Cullman	0.787	0.272	0.295	0.454	0.467	0.294
Dale	2.156	0.441	0.187	0.416	0.385	0.426
Dallas	1.200	0.398	0.138	0.326	0.282	0.404
DeKalb	1.013	0.435	0.287	0.441	0.356	0.322
Elmore	1.239	0.339	0.360	0.480	0.487	0.440
Escambia	0.895	0.337	0.347	0.434	0.304	0.475
Etowah	0.549	0.274	0.420	0.400	0.470	0.348
Fayette	1.449	0.416	0.182	0.336	0.385	0.400
Franklin	0.872	0.327	0.242	0.376	0.336	0.400
Geneva	1.758	0.288	0.128	0.348	0.390	0.442
Greene	0.383	0.340	0.251	0.312	0.223	0.412
Hale	0.494	0.412	0.259	0.295	0.241	0.427
Henry	0.458	0.162	0.226	0.326	0.405	0.397
Houston	1.658	0.422	0.308	0.465	0.492	0.407
Jackson	2.097	0.469	0.207	0.488	0.324	0.400
Jefferson	0.394	0.259	0.915	0.668	0.504	0.252
Lamar	2.069	0.452	0.153	0.381	0.335	0.417
Lauderdale	1.341	0.257	0.215	0.398	0.502	0.437
Lawrence	1.010	0.246	0.233	0.380	0.389	0.479
Lee	0.597	0.301	0.445	0.451	0.379	0.381
Limestone	0.726	0.380	0.597	0.438	0.430	0.458
Lowndes	2.197	0.439	0.112	0.372	0.330	0.374
Macon	1.124	0.263	0.113	0.302	0.412	0.352
Madison	0.610	0.421	0.804	0.567	0.437	0.324
Marengo	1.064	0.381	0.276	0.363	0.387	0.425
Marion	1.296	0.465	0.331	0.482	0.353	0.384
Marshall	0.703	0.458	0.361	0.391	0.356	0.330
Mobile	0.750	0.233	0.536	0.647	0.457	0.449
Monroe	0.632	0.300	0.311	0.377	0.362	0.382
Montgomery	1.012	0.435	0.519	0.484	0.534	0.353

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Morgan	0.828	0.379	0.425	0.458	0.449	0.337
Perry	0.231	0.261	0.160	0.261	0.259	0.381
Pickens	1.610	0.470	0.184	0.369	0.378	0.367
Pike	2.839	0.445	0.142	0.380	0.396	0.453
Randolph	1.691	0.398	0.119	0.360	0.388	0.319
Russell	1.349	0.349	0.196	0.391	0.389	0.387
Shelby	0.952	0.339	0.531	0.597	0.495	0.376
St. Clair	0.578	0.286	0.566	0.532	0.456	0.337
Sumter	0.341	0.425	0.275	0.234	0.270	0.434
Talladega	0.601	0.191	0.303	0.485	0.358	0.390
Tallapoosa	0.833	0.295	0.336	0.404	0.451	0.400
Tuscaloosa	0.979	0.323	0.497	0.603	0.488	0.382
Walker	0.532	0.213	0.339	0.481	0.371	0.341
Washington	0.962	0.402	0.352	0.448	0.320	0.415
Wilcox	0.484	0.314	0.221	0.308	0.288	0.388
Winston	0.272	0.160	0.274	0.348	0.284	0.397
Florida	**1.969**	**0.427**	**0.312**	**0.485**	**0.434**	**0.426**
Alachua	2.929	0.408	0.241	0.700	0.468	0.385
Baker	2.876	0.390	0.131	0.274	0.476	0.530
Bay	2.768	0.464	0.266	0.588	0.520	0.406
Bradford	3.497	0.365	0.096	0.320	0.524	0.421
Brevard	1.598	0.522	0.622	0.673	0.470	0.483
Broward	1.407	0.523	0.722	0.713	0.479	0.448
Calhoun	1.014	0.205	0.111	0.243	0.396	0.458
Charlotte	2.207	0.504	0.273	0.516	0.438	0.390
Citrus	3.151	0.498	0.152	0.422	0.361	0.459
Clay	1.939	0.522	0.356	0.415	0.515	0.490
Collier	2.681	0.604	0.398	0.583	0.437	0.550
Columbia	2.317	0.255	0.156	0.459	0.506	0.488
DeSoto	0.702	0.432	0.242	0.404	0.292	0.301
Dixie	1.829	0.383	0.122	0.283	0.361	0.456
Duval	1.428	0.500	0.688	0.809	0.470	0.360
Hernando	1.051	0.404	0.253	0.348	0.374	0.405
Highlands	1.938	0.473	0.245	0.516	0.383	0.357
Hillsborough	1.710	0.538	0.604	0.867	0.445	0.298
Holmes	2.212	0.317	0.104	0.284	0.434	0.455
Indian River	0.759	0.420	0.543	0.462	0.402	0.390
Jackson	2.058	0.259	0.143	0.433	0.469	0.430
Jefferson	6.115	0.529	0.087	0.316	0.555	0.439
Lafayette	0.851	0.366	0.145	0.144	0.383	0.488

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Lake	1.103	0.324	0.488	0.676	0.430	0.412
Lee	1.864	0.579	0.430	0.653	0.424	0.331
Leon	1.458	0.330	0.375	0.518	0.541	0.494
Levy	4.202	0.463	0.128	0.470	0.421	0.440
Liberty	0.935	0.227	0.193	0.195	0.265	0.713
Madison	3.320	0.476	0.129	0.393	0.474	0.376
Manatee	0.931	0.547	0.442	0.423	0.443	0.307
Marion	1.549	0.317	0.329	0.642	0.411	0.445
Martin	1.485	0.552	0.456	0.495	0.476	0.395
Miami-Dade	1.465	0.375	0.623	0.831	0.456	0.536
Monroe	2.661	0.199	0.156	0.595	0.489	0.628
Nassau	2.032	0.465	0.252	0.464	0.468	0.384
Okaloosa	1.583	0.296	0.318	0.595	0.482	0.474
Okeechobee	1.921	0.602	0.153	0.390	0.263	0.379
Orange	0.972	0.391	0.716	0.820	0.462	0.278
Osceola	1.471	0.479	0.441	0.652	0.404	0.335
Palm Beach	2.249	0.529	0.494	0.817	0.470	0.407
Pasco	1.483	0.465	0.380	0.588	0.378	0.367
Pinellas	1.818	0.561	0.436	0.598	0.436	0.391
Polk	1.416	0.388	0.514	0.834	0.429	0.329
Putnam	2.273	0.375	0.160	0.495	0.335	0.404
Santa Rosa	1.073	0.336	0.470	0.557	0.440	0.469
Sarasota	1.293	0.560	0.428	0.476	0.519	0.285
Seminole	0.517	0.356	0.747	0.503	0.524	0.290
St. Johns	1.989	0.533	0.388	0.533	0.448	0.466
St. Lucie	0.725	0.518	0.532	0.449	0.398	0.311
Sumter	0.841	0.370	0.381	0.427	0.346	0.426
Suwannee	2.327	0.394	0.120	0.368	0.446	0.345
Taylor	3.961	0.617	0.115	0.326	0.398	0.444
Union	2.831	0.402	0.075	0.253	0.432	0.409
Volusia	1.949	0.482	0.474	0.741	0.428	0.447
Wakulla	2.270	0.335	0.216	0.353	0.483	0.640
Walton	1.877	0.216	0.172	0.538	0.430	0.496
Washington	1.939	0.301	0.147	0.341	0.431	0.485
Georgia	**1.429**	**0.442**	**0.224**	**0.282**	**0.420**	**0.395**
Appling	4.127	0.462	0.088	0.265	0.589	0.374
Atkinson	-2.627	0.675	0.083	0.216	0.140	0.336
Bacon	0.755	0.461	0.095	0.185	0.363	0.387
Baker	0.633	0.387	0.090	0.221	0.182	0.488
Baldwin	0.892	0.314	0.176	0.299	0.450	0.334

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Banks	0.569	0.544	0.230	0.246	0.411	0.316
Barrow	0.222	0.461	0.503	0.251	0.470	0.265
Bartow	0.307	0.204	0.583	0.388	0.452	0.387
Ben Hill	0.479	0.263	0.109	0.217	0.373	0.360
Berrien	2.317	0.504	0.083	0.269	0.330	0.413
Bibb	0.305	0.431	0.531	0.287	0.502	0.253
Bleckley	3.087	0.429	0.100	0.267	0.449	0.456
Brantley	1.791	0.525	0.113	0.278	0.352	0.389
Brooks	2.427	0.421	0.080	0.263	0.341	0.442
Bryan	3.878	0.488	0.172	0.411	0.526	0.504
Bulloch	2.522	0.457	0.185	0.388	0.458	0.442
Burke	3.251	0.497	0.129	0.379	0.428	0.403
Butts	1.569	0.610	0.179	0.236	0.483	0.359
Calhoun	2.999	0.520	0.077	0.222	0.372	0.457
Camden	3.705	0.721	0.259	0.392	0.478	0.549
Candler	2.086	0.383	0.069	0.175	0.434	0.429
Carroll	0.728	0.366	0.304	0.373	0.442	0.301
Catoosa	0.183	0.463	0.585	0.221	0.417	0.335
Charlton	3.361	0.585	0.125	0.233	0.342	0.580
Chatham	1.541	0.517	0.697	0.625	0.566	0.530
Chattahoochee	1.236	0.385	0.167	0.260	0.238	0.559
Chattooga	0.511	0.299	0.138	0.256	0.308	0.385
Cherokee	0.370	0.261	0.611	0.354	0.535	0.354
Clarke	0.062	0.398	0.654	0.251	0.427	0.242
Clay	-0.255	0.299	0.098	0.199	0.216	0.392
Clayton	0.019	0.567	0.477	0.238	0.450	0.202
Clinch	-0.909	0.471	0.129	0.185	0.172	0.374
Cobb	0.347	0.359	0.558	0.380	0.514	0.210
Coffee	1.726	0.454	0.124	0.299	0.446	0.324
Colquitt	4.204	0.520	0.108	0.389	0.470	0.372
Columbia	1.182	0.560	0.471	0.297	0.544	0.460
Cook	1.845	0.536	0.155	0.223	0.416	0.456
Coweta	1.205	0.505	0.400	0.387	0.555	0.339
Crawford	0.660	0.518	0.121	0.267	0.259	0.380
Crisp	1.551	0.407	0.188	0.289	0.465	0.421
Dade	0.052	0.134	0.275	0.234	0.348	0.325
Dawson	0.452	0.220	0.353	0.242	0.471	0.470
Decatur	0.681	0.081	0.120	0.357	0.482	0.453
DeKalb	0.629	0.539	0.483	0.441	0.493	0.170
Dodge	1.765	0.298	0.088	0.308	0.391	0.380
Dooly	2.408	0.476	0.090	0.242	0.349	0.458

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Dougherty	1.146	0.324	0.269	0.342	0.491	0.436
Douglas	0.301	0.478	0.481	0.259	0.502	0.254
Early	2.699	0.461	0.096	0.253	0.390	0.456
Echols	-1.569	0.443	0.084	0.197	0.094	0.403
Effingham	2.241	0.489	0.257	0.409	0.497	0.452
Elbert	1.207	0.431	0.165	0.247	0.444	0.379
Emanuel	2.643	0.463	0.091	0.301	0.403	0.377
Evans	5.126	0.636	0.085	0.226	0.446	0.492
Fannin	1.802	0.381	0.224	0.244	0.518	0.566
Fayette	0.802	0.530	0.470	0.278	0.560	0.354
Floyd	0.489	0.352	0.382	0.288	0.423	0.379
Forsyth	0.630	0.477	0.587	0.313	0.533	0.364
Franklin	0.834	0.591	0.246	0.239	0.442	0.342
Fulton	1.198	0.482	0.551	0.709	0.490	0.210
Gilmer	0.975	0.300	0.238	0.278	0.402	0.506
Glascock	-1.372	0.564	0.103	0.125	0.342	0.302
Glynn	1.745	0.478	0.352	0.366	0.552	0.497
Gordon	0.309	0.320	0.535	0.326	0.376	0.370
Grady	4.522	0.536	0.089	0.307	0.389	0.473
Greene	2.138	0.406	0.123	0.309	0.405	0.417
Gwinnett	0.561	0.561	0.569	0.418	0.553	0.150
Habersham	0.406	0.182	0.372	0.339	0.475	0.403
Hall	0.731	0.528	0.606	0.380	0.536	0.314
Hancock	1.418	0.330	0.085	0.234	0.414	0.378
Haralson	0.330	0.351	0.182	0.249	0.383	0.307
Harris	2.349	0.446	0.158	0.373	0.447	0.389
Hart	1.536	0.582	0.225	0.275	0.401	0.436
Heard	0.581	0.512	0.138	0.228	0.351	0.350
Henry	1.149	0.631	0.457	0.341	0.540	0.351
Houston	0.753	0.506	0.504	0.329	0.470	0.387
Irwin	1.287	0.347	0.086	0.207	0.437	0.370
Jackson	0.777	0.547	0.489	0.378	0.479	0.303
Jasper	3.004	0.581	0.099	0.318	0.370	0.381
Jeff Davis	0.376	0.482	0.084	0.185	0.360	0.352
Jefferson	2.902	0.534	0.107	0.293	0.441	0.380
Jenkins	0.049	0.470	0.088	0.117	0.334	0.424
Johnson	1.213	0.562	0.133	0.269	0.308	0.392
Jones	3.045	0.434	0.113	0.340	0.481	0.382
Lamar	0.931	0.486	0.215	0.228	0.422	0.397
Lanier	1.448	0.565	0.113	0.247	0.337	0.394
Laurens	3.785	0.497	0.147	0.383	0.584	0.386

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Lee	3.040	0.684	0.217	0.365	0.515	0.399
Liberty	2.494	0.547	0.214	0.396	0.366	0.488
Lincoln	2.998	0.539	0.120	0.233	0.360	0.545
Long	1.118	0.260	0.109	0.268	0.302	0.473
Lowndes	1.689	0.491	0.334	0.443	0.516	0.388
Lumpkin	0.971	0.279	0.251	0.273	0.393	0.558
Macon	2.381	0.466	0.093	0.218	0.398	0.452
Madison	1.003	0.443	0.214	0.275	0.513	0.303
Marion	-0.030	0.396	0.101	0.204	0.189	0.438
McDuffie	3.066	0.579	0.148	0.236	0.548	0.439
McIntosh	1.149	0.154	0.143	0.328	0.453	0.529
Meriwether	1.775	0.400	0.145	0.309	0.439	0.390
Miller	2.100	0.564	0.173	0.204	0.486	0.466
Mitchell	2.388	0.423	0.156	0.323	0.505	0.420
Monroe	1.839	0.497	0.205	0.356	0.524	0.318
Montgomery	0.836	0.593	0.072	0.237	0.283	0.371
Morgan	2.751	0.530	0.169	0.370	0.541	0.336
Murray	0.331	0.271	0.248	0.295	0.231	0.432
Muscogee	0.435	0.338	0.472	0.281	0.490	0.365
Newton	0.691	0.532	0.412	0.311	0.475	0.314
Oconee	0.588	0.493	0.494	0.296	0.592	0.259
Oglethorpe	0.965	0.443	0.145	0.264	0.311	0.408
Paulding	0.433	0.402	0.444	0.274	0.460	0.343
Peach	0.833	0.592	0.431	0.283	0.455	0.390
Pickens	0.397	0.276	0.397	0.327	0.445	0.336
Pierce	3.446	0.534	0.098	0.290	0.421	0.420
Pike	3.933	0.565	0.128	0.322	0.523	0.408
Polk	0.307	0.268	0.378	0.291	0.416	0.342
Pulaski	2.688	0.421	0.116	0.232	0.465	0.493
Putnam	1.555	0.378	0.145	0.270	0.404	0.440
Quitman	-0.319	0.224	0.086	0.171	0.227	0.397
Rabun	1.467	0.442	0.294	0.284	0.493	0.508
Randolph	0.831	0.283	0.075	0.227	0.357	0.370
Richmond	0.727	0.492	0.591	0.341	0.556	0.355
Rockdale	0.590	0.579	0.436	0.216	0.594	0.286
Schley	0.459	0.361	0.130	0.216	0.240	0.454
Screven	3.197	0.577	0.099	0.221	0.431	0.454
Seminole	0.717	0.201	0.159	0.223	0.428	0.461
Spalding	0.556	0.505	0.391	0.238	0.466	0.359
Stephens	0.390	0.250	0.359	0.231	0.496	0.394
Stewart	0.563	0.312	0.094	0.227	0.292	0.403

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Sumter	3.518	0.479	0.129	0.333	0.500	0.440
Talbot	0.226	0.374	0.060	0.237	0.251	0.371
Taliaferro	-3.631	0.560	0.106	0.057	0.112	0.383
Tattnall	4.646	0.537	0.065	0.278	0.363	0.451
Taylor	1.472	0.583	0.109	0.269	0.292	0.400
Telfair	2.051	0.367	0.066	0.259	0.361	0.395
Terrell	1.127	0.527	0.060	0.187	0.332	0.398
Thomas	4.311	0.391	0.111	0.402	0.500	0.475
Tift	1.221	0.387	0.257	0.315	0.515	0.390
Toombs	3.573	0.535	0.089	0.289	0.420	0.407
Towns	2.695	0.452	0.182	0.191	0.611	0.559
Treutlen	0.504	0.250	0.080	0.165	0.459	0.334
Troup	1.240	0.414	0.290	0.366	0.448	0.412
Turner	0.958	0.410	0.060	0.239	0.275	0.392
Twiggs	2.044	0.418	0.070	0.282	0.323	0.390
Union	0.294	0.044	0.168	0.231	0.543	0.586
Upson	1.351	0.504	0.104	0.257	0.400	0.328
Walker	0.156	0.136	0.253	0.274	0.310	0.386
Walton	1.092	0.479	0.345	0.382	0.542	0.286
Ware	3.338	0.547	0.157	0.302	0.524	0.459
Warren	-0.387	0.478	0.086	0.178	0.258	0.386
Washington	6.120	0.578	0.090	0.348	0.500	0.424
Wayne	3.731	0.487	0.080	0.308	0.448	0.370
Webster	-0.656	0.333	0.100	0.130	0.189	0.441
Wheeler	1.086	0.481	0.066	0.193	0.374	0.366
White	1.147	0.455	0.265	0.219	0.527	0.426
Whitfield	0.266	0.360	0.411	0.289	0.380	0.320
Wilcox	-0.022	0.297	0.061	0.136	0.314	0.413
Wilkes	1.194	0.583	0.099	0.176	0.371	0.409
Wilkinson	3.101	0.524	0.114	0.263	0.509	0.395
Worth	4.686	0.512	0.070	0.308	0.432	0.394
Kentucky	**1.041**	**0.534**	**0.200**	**0.255**	**0.388**	**0.371**
Adair	1.691	0.550	0.110	0.259	0.433	0.325
Allen	0.282	0.438	0.132	0.265	0.259	0.354
Anderson	1.532	0.417	0.170	0.275	0.556	0.326
Ballard	1.473	0.643	0.185	0.183	0.473	0.410
Barren	1.054	0.263	0.163	0.322	0.407	0.405
Bath	-0.424	0.601	0.152	0.213	0.269	0.324
Bell	0.675	0.467	0.199	0.277	0.224	0.451
Boone	0.674	0.613	0.571	0.289	0.531	0.331

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Bourbon	3.942	0.679	0.124	0.284	0.439	0.447
Boyd	0.773	0.609	0.304	0.236	0.399	0.396
Boyle	1.410	0.652	0.180	0.213	0.478	0.359
Bracken	0.128	0.652	0.095	0.199	0.306	0.360
Breathitt	-0.534	0.735	0.153	0.236	0.220	0.336
Breckinridge	3.037	0.537	0.098	0.276	0.476	0.359
Bullitt	1.307	0.654	0.386	0.330	0.498	0.372
Butler	0.873	0.316	0.089	0.214	0.412	0.352
Caldwell	1.836	0.534	0.148	0.232	0.474	0.390
Calloway	0.948	0.350	0.237	0.304	0.491	0.353
Campbell	0.295	0.576	0.389	0.174	0.473	0.329
Carlisle	0.050	0.509	0.176	0.159	0.338	0.378
Carroll	0.213	0.567	0.153	0.257	0.255	0.354
Carter	0.684	0.598	0.119	0.272	0.275	0.354
Casey	0.509	0.477	0.084	0.208	0.319	0.369
Christian	1.141	0.400	0.288	0.363	0.383	0.449
Clark	1.588	0.534	0.172	0.308	0.424	0.350
Clay	0.234	0.550	0.163	0.224	0.218	0.424
Clinton	0.718	0.547	0.134	0.199	0.348	0.391
Crittenden	-0.248	0.649	0.142	0.133	0.336	0.378
Cumberland	-0.205	0.307	0.128	0.135	0.353	0.350
Daviess	1.442	0.593	0.397	0.359	0.595	0.341
Edmonson	0.640	0.451	0.099	0.199	0.266	0.443
Elliott	-1.907	0.718	0.122	0.165	0.240	0.311
Estill	0.119	0.533	0.179	0.228	0.287	0.353
Fayette	0.780	0.601	0.500	0.369	0.481	0.293
Fleming	0.361	0.546	0.163	0.225	0.369	0.319
Floyd	0.346	0.559	0.170	0.282	0.385	0.243
Franklin	1.244	0.557	0.243	0.226	0.568	0.335
Fulton	-0.616	0.472	0.201	0.107	0.206	0.426
Gallatin	0.132	0.597	0.175	0.200	0.324	0.353
Garrard	2.002	0.583	0.115	0.253	0.428	0.359
Grant	3.633	0.577	0.103	0.299	0.481	0.370
Graves	1.356	0.480	0.200	0.288	0.447	0.373
Grayson	0.534	0.571	0.242	0.238	0.401	0.327
Green	0.860	0.497	0.116	0.184	0.431	0.351
Greenup	1.168	0.624	0.253	0.346	0.358	0.345
Hancock	1.432	0.698	0.204	0.222	0.475	0.363
Hardin	1.638	0.472	0.283	0.428	0.466	0.376
Harlan	0.184	0.432	0.198	0.266	0.291	0.326
Harrison	2.757	0.692	0.135	0.236	0.479	0.394

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Hart	-0.204	0.300	0.138	0.215	0.264	0.332
Henderson	2.306	0.628	0.252	0.399	0.432	0.412
Henry	2.324	0.707	0.110	0.219	0.443	0.369
Hickman	0.194	0.412	0.159	0.081	0.448	0.398
Hopkins	1.968	0.480	0.198	0.368	0.494	0.350
Jackson	1.219	0.576	0.145	0.276	0.277	0.418
Jefferson	0.774	0.628	0.675	0.507	0.466	0.230
Jessamine	0.928	0.631	0.344	0.283	0.436	0.364
Johnson	-0.126	0.586	0.232	0.234	0.308	0.293
Kenton	0.233	0.608	0.667	0.210	0.474	0.311
Knott	0.192	0.592	0.123	0.287	0.215	0.346
Knox	0.636	0.389	0.131	0.222	0.316	0.407
Larue	2.345	0.488	0.097	0.212	0.513	0.364
Laurel	0.828	0.411	0.313	0.308	0.408	0.410
Lawrence	0.017	0.413	0.144	0.263	0.240	0.339
Lee	-0.200	0.743	0.174	0.232	0.233	0.356
Leslie	-0.037	0.365	0.160	0.243	0.164	0.412
Letcher	-0.300	0.407	0.143	0.278	0.204	0.306
Lewis	-1.535	0.650	0.138	0.166	0.217	0.328
Lincoln	2.338	0.411	0.121	0.306	0.511	0.352
Livingston	0.686	0.693	0.237	0.189	0.440	0.352
Logan	2.825	0.608	0.150	0.310	0.423	0.424
Lyon	2.069	0.551	0.188	0.159	0.496	0.532
Madison	1.268	0.535	0.373	0.394	0.458	0.379
Magoffin	-0.640	0.501	0.300	0.178	0.214	0.294
Marion	2.918	0.498	0.109	0.239	0.511	0.407
Marshall	0.646	0.408	0.369	0.278	0.502	0.349
Martin	-1.292	0.454	0.168	0.238	0.063	0.310
Mason	1.310	0.557	0.151	0.243	0.451	0.334
McCracken	0.586	0.510	0.615	0.290	0.517	0.373
McCreary	0.281	0.408	0.161	0.213	0.165	0.496
McLean	0.815	0.586	0.171	0.190	0.407	0.379
Meade	2.209	0.572	0.114	0.301	0.343	0.393
Menifee	1.070	0.469	0.204	0.261	0.386	0.412
Mercer	1.564	0.575	0.180	0.281	0.465	0.337
Metcalfe	-1.225	0.468	0.067	0.143	0.266	0.375
Monroe	-0.629	0.379	0.160	0.147	0.244	0.350
Montgomery	1.465	0.608	0.194	0.278	0.393	0.388
Morgan	0.300	0.592	0.339	0.253	0.381	0.304
Muhlenberg	2.933	0.541	0.129	0.293	0.508	0.374
Nelson	3.634	0.574	0.162	0.346	0.566	0.404

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Nicholas	0.412	0.442	0.106	0.152	0.390	0.378
Ohio	3.126	0.633	0.137	0.299	0.486	0.376
Oldham	1.095	0.663	0.410	0.288	0.538	0.346
Owen	1.738	0.426	0.096	0.270	0.410	0.352
Owsley	-0.088	0.591	0.227	0.202	0.254	0.377
Pendleton	3.494	0.649	0.119	0.253	0.520	0.384
Perry	0.217	0.433	0.195	0.306	0.279	0.299
Pike	1.982	0.525	0.151	0.478	0.320	0.271
Powell	0.553	0.352	0.200	0.272	0.298	0.408
Pulaski	0.721	0.292	0.329	0.307	0.427	0.469
Robertson	-1.436	0.716	0.128	0.184	0.195	0.353
Rockcastle	1.170	0.473	0.200	0.306	0.386	0.375
Rowan	1.992	0.612	0.225	0.321	0.444	0.408
Russell	1.489	0.386	0.147	0.192	0.478	0.454
Scott	1.808	0.625	0.252	0.338	0.453	0.382
Shelby	3.048	0.636	0.215	0.376	0.519	0.411
Simpson	1.187	0.463	0.145	0.240	0.386	0.396
Spencer	4.870	0.593	0.087	0.278	0.568	0.349
Taylor	1.796	0.414	0.151	0.215	0.469	0.472
Todd	1.655	0.561	0.125	0.230	0.340	0.443
Trigg	3.384	0.508	0.134	0.230	0.452	0.564
Trimble	-0.223	0.701	0.148	0.126	0.395	0.342
Union	2.354	0.604	0.138	0.258	0.421	0.416
Warren	0.864	0.321	0.297	0.408	0.466	0.324
Washington	3.732	0.666	0.120	0.230	0.605	0.354
Wayne	0.077	0.501	0.121	0.188	0.332	0.352
Webster	1.118	0.626	0.282	0.235	0.475	0.383
Whitley	0.625	0.423	0.210	0.236	0.374	0.384
Wolfe	-0.919	0.460	0.189	0.159	0.130	0.384
Woodford	2.647	0.616	0.195	0.303	0.471	0.450
Mississippi	**1.434**	**0.494**	**0.273**	**0.337**	**0.382**	**0.444**
Adams	2.886	0.636	0.190	0.300	0.467	0.467
Alcorn	1.459	0.347	0.122	0.317	0.440	0.327
Amite	1.966	0.516	0.204	0.358	0.364	0.449
Attala	0.973	0.507	0.229	0.299	0.353	0.386
Benton	0.072	0.602	0.332	0.233	0.164	0.445
Bolivar	2.416	0.587	0.249	0.445	0.365	0.456
Calhoun	1.578	0.512	0.114	0.326	0.301	0.363
Carroll	0.701	0.639	0.268	0.298	0.304	0.367
Chickasaw	2.654	0.529	0.176	0.339	0.347	0.528

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Choctaw	0.858	0.481	0.310	0.282	0.392	0.418
Claiborne	0.467	0.370	0.281	0.228	0.386	0.403
Clarke	1.112	0.398	0.251	0.347	0.384	0.415
Clay	1.147	0.390	0.244	0.341	0.306	0.490
Coahoma	2.234	0.620	0.204	0.346	0.345	0.463
Copiah	1.391	0.360	0.191	0.355	0.399	0.410
Covington	1.342	0.472	0.280	0.334	0.441	0.423
DeSoto	1.006	0.596	0.638	0.433	0.449	0.423
Forrest	0.881	0.418	0.586	0.394	0.465	0.516
Franklin	0.804	0.461	0.260	0.219	0.377	0.459
George	2.366	0.378	0.178	0.328	0.473	0.533
Greene	1.208	0.377	0.208	0.324	0.317	0.481
Grenada	1.178	0.488	0.212	0.296	0.376	0.400
Hancock	0.950	0.444	0.429	0.430	0.336	0.451
Harrison	0.730	0.464	0.754	0.462	0.428	0.453
Hinds	2.115	0.561	0.392	0.554	0.519	0.400
Holmes	1.275	0.505	0.214	0.327	0.293	0.444
Humphreys	0.919	0.591	0.281	0.229	0.242	0.550
Issaquena	-0.069	0.577	0.419	0.232	0.103	0.459
Itawamba	1.361	0.468	0.141	0.262	0.370	0.400
Jackson	1.429	0.406	0.427	0.473	0.391	0.599
Jasper	1.555	0.476	0.262	0.365	0.343	0.493
Jefferson	0.267	0.520	0.298	0.248	0.248	0.409
Jefferson Davis	0.739	0.432	0.241	0.286	0.292	0.438
Jones	1.861	0.447	0.260	0.415	0.435	0.455
Kemper	1.062	0.528	0.310	0.382	0.313	0.403
Lafayette	2.235	0.404	0.220	0.448	0.429	0.479
Lamar	0.951	0.414	0.513	0.424	0.442	0.480
Lauderdale	2.096	0.517	0.293	0.460	0.482	0.414
Lawrence	1.287	0.568	0.320	0.315	0.427	0.426
Leake	1.388	0.564	0.239	0.302	0.402	0.405
Lee	1.074	0.569	0.521	0.401	0.489	0.388
Leflore	2.371	0.611	0.185	0.329	0.380	0.445
Lincoln	1.768	0.366	0.197	0.383	0.511	0.378
Lowndes	1.352	0.413	0.391	0.398	0.497	0.505
Madison	1.703	0.560	0.478	0.510	0.539	0.420
Marion	1.734	0.519	0.271	0.364	0.428	0.445
Marshall	2.285	0.590	0.186	0.386	0.369	0.394
Monroe	3.523	0.488	0.157	0.415	0.429	0.483
Montgomery	1.246	0.598	0.225	0.235	0.521	0.333
Neshoba	1.137	0.448	0.283	0.363	0.366	0.419

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Newton	1.506	0.446	0.263	0.306	0.475	0.463
Noxubee	0.966	0.491	0.263	0.251	0.331	0.488
Oktibbeha	1.753	0.497	0.264	0.420	0.363	0.447
Panola	2.253	0.539	0.191	0.371	0.396	0.419
Pearl River	1.010	0.354	0.384	0.427	0.405	0.472
Perry	2.028	0.404	0.211	0.318	0.307	0.655
Pike	1.936	0.495	0.237	0.346	0.471	0.439
Pontotoc	1.350	0.476	0.234	0.315	0.445	0.387
Prentiss	1.402	0.473	0.142	0.292	0.419	0.333
Quitman	0.588	0.608	0.193	0.180	0.272	0.476
Rankin	1.234	0.522	0.652	0.566	0.544	0.393
Scott	1.773	0.466	0.336	0.385	0.421	0.580
Sharkey	-0.138	0.489	0.301	0.090	0.138	0.572
Simpson	1.512	0.416	0.227	0.311	0.530	0.388
Smith	1.358	0.442	0.262	0.331	0.398	0.464
Stone	0.767	0.135	0.208	0.361	0.425	0.563
Sunflower	2.889	0.637	0.164	0.357	0.339	0.458
Tallahatchie	1.523	0.494	0.118	0.256	0.318	0.430
Tate	2.016	0.622	0.172	0.284	0.401	0.411
Tippah	1.268	0.497	0.144	0.327	0.348	0.330
Tishomingo	1.699	0.371	0.125	0.278	0.342	0.471
Tunica	0.461	0.762	0.386	0.243	0.209	0.478
Union	1.706	0.492	0.165	0.338	0.424	0.342
Walthall	1.957	0.623	0.206	0.291	0.405	0.438
Warren	1.837	0.633	0.335	0.360	0.468	0.444
Washington	2.148	0.599	0.209	0.324	0.400	0.447
Wayne	0.728	0.272	0.196	0.312	0.304	0.445
Webster	0.468	0.540	0.261	0.271	0.316	0.360
Wilkinson	1.320	0.447	0.210	0.309	0.397	0.413
Winston	1.137	0.549	0.384	0.313	0.435	0.449
Yalobusha	2.471	0.443	0.095	0.260	0.360	0.460
Yazoo	1.619	0.578	0.241	0.333	0.296	0.490
North Carolina	**2.141**	**0.435**	**0.273**	**0.419**	**0.463**	**0.431**
Alamance	1.273	0.525	0.376	0.435	0.471	0.336
Alexander	1.467	0.448	0.200	0.335	0.466	0.345
Alleghany	0.907	0.201	0.123	0.341	0.384	0.362
Anson	2.841	0.483	0.109	0.356	0.385	0.381
Ashe	1.514	0.221	0.120	0.378	0.480	0.354
Avery	1.523	0.251	0.174	0.393	0.481	0.434
Beaufort	2.216	0.560	0.381	0.459	0.513	0.519

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Bertie	4.796	0.560	0.156	0.382	0.545	0.508
Bladen	3.478	0.386	0.132	0.482	0.367	0.481
Brunswick	2.343	0.522	0.356	0.589	0.418	0.491
Buncombe	0.269	0.110	0.506	0.502	0.551	0.332
Burke	1.031	0.289	0.286	0.444	0.383	0.441
Cabarrus	0.704	0.604	0.649	0.363	0.508	0.322
Caldwell	1.284	0.427	0.284	0.355	0.466	0.405
Camden	2.638	0.533	0.226	0.335	0.437	0.556
Carteret	3.317	0.555	0.307	0.440	0.481	0.697
Caswell	2.756	0.526	0.127	0.380	0.347	0.394
Catawba	1.204	0.471	0.506	0.519	0.509	0.370
Chatham	2.844	0.466	0.226	0.535	0.498	0.396
Cherokee	0.338	0.066	0.227	0.367	0.540	0.456
Chowan	3.880	0.500	0.143	0.287	0.463	0.582
Clay	0.731	0.100	0.169	0.325	0.556	0.522
Cleveland	1.562	0.447	0.291	0.429	0.491	0.369
Columbus	5.948	0.436	0.124	0.546	0.529	0.488
Craven	2.412	0.532	0.383	0.512	0.436	0.616
Cumberland	0.915	0.494	0.585	0.471	0.443	0.389
Currituck	3.740	0.540	0.201	0.397	0.421	0.614
Dare	2.975	0.552	0.389	0.444	0.553	0.742
Davidson	1.850	0.568	0.317	0.457	0.466	0.366
Davie	2.659	0.533	0.191	0.387	0.536	0.353
Duplin	4.644	0.491	0.105	0.520	0.339	0.383
Durham	0.490	0.386	0.585	0.394	0.451	0.328
Edgecombe	2.948	0.488	0.150	0.375	0.425	0.438
Forsyth	0.512	0.501	0.553	0.396	0.456	0.250
Franklin	2.728	0.444	0.210	0.493	0.443	0.448
Gaston	0.856	0.537	0.686	0.534	0.455	0.316
Gates	4.175	0.486	0.129	0.318	0.486	0.532
Graham	0.933	0.171	0.179	0.328	0.426	0.513
Granville	2.302	0.494	0.217	0.416	0.443	0.421
Greene	1.669	0.496	0.222	0.332	0.402	0.435
Guilford	1.179	0.569	0.570	0.514	0.470	0.360
Halifax	4.425	0.500	0.129	0.483	0.396	0.439
Harnett	2.033	0.501	0.254	0.443	0.418	0.418
Haywood	0.919	0.136	0.202	0.440	0.559	0.446
Henderson	0.363	0.206	0.474	0.403	0.520	0.301
Hertford	3.014	0.524	0.153	0.361	0.443	0.426
Hoke	1.588	0.385	0.201	0.370	0.389	0.440
Hyde	1.570	0.435	0.441	0.305	0.587	0.662

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Iredell	1.029	0.577	0.582	0.471	0.500	0.325
Jackson	1.324	0.250	0.238	0.457	0.520	0.414
Johnston	2.011	0.543	0.406	0.573	0.491	0.412
Jones	3.183	0.547	0.191	0.341	0.365	0.605
Lee	0.777	0.439	0.432	0.365	0.476	0.349
Lenoir	3.006	0.595	0.184	0.363	0.465	0.427
Lincoln	0.934	0.470	0.463	0.374	0.470	0.406
Macon	0.973	0.213	0.309	0.407	0.591	0.472
Madison	0.909	0.187	0.189	0.405	0.523	0.330
Martin	4.457	0.514	0.154	0.434	0.478	0.504
McDowell	0.606	0.210	0.262	0.358	0.360	0.445
Mecklenburg	0.973	0.557	0.693	0.661	0.449	0.231
Mitchell	1.083	0.208	0.148	0.306	0.522	0.378
Montgomery	2.574	0.461	0.134	0.420	0.355	0.379
Moore	2.263	0.423	0.199	0.501	0.483	0.318
Nash	2.618	0.436	0.222	0.501	0.474	0.433
New Hanover	1.185	0.498	0.588	0.389	0.531	0.537
Northampton	5.823	0.606	0.117	0.488	0.389	0.430
Onslow	1.921	0.575	0.390	0.459	0.364	0.555
Orange	2.116	0.420	0.184	0.365	0.442	0.442
Pamlico	2.457	0.525	0.290	0.308	0.502	0.631
Pasquotank	1.874	0.539	0.289	0.309	0.448	0.529
Pender	6.660	0.579	0.126	0.471	0.494	0.499
Perquimans	3.208	0.480	0.156	0.315	0.388	0.586
Person	2.918	0.421	0.132	0.360	0.514	0.385
Pitt	2.160	0.555	0.362	0.514	0.496	0.433
Polk	1.653	0.407	0.191	0.370	0.556	0.284
Randolph	3.492	0.520	0.187	0.539	0.435	0.391
Richmond	1.319	0.362	0.195	0.419	0.354	0.366
Robeson	3.475	0.426	0.176	0.561	0.429	0.445
Rockingham	2.225	0.501	0.224	0.448	0.438	0.383
Rowan	1.515	0.535	0.326	0.436	0.457	0.351
Rutherford	1.290	0.224	0.195	0.493	0.453	0.376
Sampson	4.780	0.544	0.126	0.489	0.417	0.401
Scotland	2.232	0.472	0.172	0.398	0.386	0.405
Stanly	2.067	0.472	0.204	0.380	0.545	0.329
Stokes	2.577	0.484	0.148	0.415	0.485	0.296
Surry	1.623	0.459	0.217	0.399	0.447	0.335
Swain	0.078	0.010	0.195	0.417	0.544	0.542
Transylvania	1.953	0.329	0.221	0.397	0.609	0.431
Tyrrell	1.435	0.674	0.565	0.247	0.417	0.701

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Union	1.515	0.581	0.445	0.484	0.518	0.347
Vance	3.069	0.497	0.141	0.336	0.490	0.411
Wake	1.128	0.457	0.714	0.736	0.509	0.326
Warren	2.776	0.455	0.136	0.407	0.347	0.432
Washington	1.551	0.454	0.288	0.268	0.399	0.604
Watauga	1.142	0.243	0.165	0.385	0.450	0.353
Wayne	2.309	0.450	0.206	0.473	0.432	0.385
Wilkes	1.767	0.415	0.150	0.379	0.401	0.341
Wilson	1.636	0.471	0.308	0.380	0.484	0.451
Yadkin	4.462	0.548	0.112	0.404	0.469	0.370
Yancey	0.265	0.063	0.159	0.281	0.499	0.380
South Carolina	**1.969**	**0.462**	**0.279**	**0.393**	**0.437**	**0.420**
Abbeville	1.504	0.292	0.153	0.335	0.464	0.400
Aiken	1.764	0.498	0.371	0.509	0.491	0.403
Allendale	-0.074	0.505	0.192	0.182	0.268	0.390
Anderson	1.431	0.539	0.536	0.506	0.506	0.441
Bamberg	1.312	0.505	0.115	0.275	0.333	0.370
Barnwell	2.140	0.440	0.153	0.278	0.412	0.487
Beaufort	1.340	0.484	0.432	0.372	0.493	0.502
Berkeley	2.543	0.577	0.445	0.565	0.428	0.656
Calhoun	3.102	0.558	0.142	0.338	0.511	0.361
Charleston	1.980	0.587	0.586	0.553	0.508	0.611
Cherokee	0.509	0.444	0.295	0.376	0.355	0.260
Chester	1.697	0.521	0.166	0.365	0.370	0.342
Chesterfield	1.681	0.410	0.148	0.373	0.343	0.383
Clarendon	3.264	0.494	0.142	0.401	0.380	0.457
Colleton	4.613	0.537	0.150	0.419	0.496	0.488
Darlington	2.134	0.427	0.172	0.402	0.409	0.400
Dillon	2.725	0.483	0.098	0.341	0.338	0.399
Dorchester	1.670	0.611	0.458	0.409	0.489	0.489
Edgefield	2.193	0.472	0.157	0.282	0.371	0.510
Fairfield	4.046	0.551	0.109	0.376	0.469	0.357
Florence	1.593	0.381	0.323	0.466	0.501	0.456
Georgetown	3.306	0.384	0.157	0.458	0.432	0.524
Greenville	0.805	0.480	0.785	0.575	0.513	0.315
Greenwood	1.426	0.420	0.226	0.325	0.504	0.370
Hampton	2.371	0.412	0.105	0.287	0.411	0.420
Horry	1.611	0.444	0.409	0.531	0.433	0.495
Jasper	2.450	0.403	0.159	0.331	0.526	0.427
Kershaw	1.844	0.371	0.207	0.434	0.526	0.341

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Lancaster	1.349	0.550	0.271	0.361	0.436	0.344
Laurens	1.426	0.430	0.200	0.398	0.398	0.333
Lee	1.241	0.298	0.105	0.298	0.322	0.412
Lexington	1.117	0.563	0.615	0.476	0.561	0.346
Marion	3.977	0.369	0.097	0.354	0.444	0.498
Marlboro	1.577	0.402	0.102	0.296	0.295	0.419
McCormick	2.143	0.470	0.169	0.278	0.343	0.551
Newberry	2.943	0.494	0.172	0.326	0.549	0.437
Oconee	0.867	0.283	0.360	0.411	0.459	0.449
Orangeburg	4.303	0.523	0.152	0.511	0.456	0.404
Pickens	1.055	0.427	0.420	0.427	0.491	0.380
Richland	0.811	0.455	0.694	0.502	0.515	0.360
Saluda	1.881	0.414	0.107	0.286	0.329	0.439
Spartanburg	0.697	0.482	0.747	0.521	0.483	0.302
Sumter	1.516	0.454	0.287	0.374	0.486	0.409
Union	1.576	0.409	0.140	0.363	0.353	0.358
Williamsburg	4.397	0.399	0.103	0.365	0.459	0.512
York	0.699	0.586	0.698	0.451	0.457	0.299
Tennessee	**0.888**	**0.370**	**0.260**	**0.305**	**0.409**	**0.370**
Anderson	0.307	0.259	0.392	0.308	0.437	0.319
Bedford	0.657	0.312	0.228	0.358	0.422	0.283
Benton	0.940	0.394	0.148	0.212	0.398	0.409
Bledsoe	0.408	0.372	0.161	0.258	0.352	0.324
Blount	0.340	0.235	0.626	0.346	0.498	0.408
Bradley	0.288	0.366	0.520	0.293	0.459	0.295
Campbell	0.620	0.252	0.177	0.291	0.345	0.399
Cannon	0.257	0.387	0.104	0.239	0.377	0.281
Carroll	2.032	0.503	0.174	0.324	0.420	0.413
Carter	0.532	0.138	0.174	0.277	0.418	0.451
Cheatham	2.588	0.476	0.141	0.306	0.485	0.406
Chester	1.342	0.374	0.137	0.244	0.413	0.419
Claiborne	0.624	0.271	0.164	0.305	0.319	0.382
Clay	0.980	0.522	0.130	0.225	0.297	0.432
Cocke	0.341	0.158	0.209	0.293	0.350	0.400
Coffee	1.068	0.391	0.312	0.307	0.523	0.409
Crockett	1.977	0.530	0.139	0.312	0.409	0.359
Cumberland	0.744	0.321	0.256	0.344	0.412	0.353
Davidson	0.741	0.488	0.595	0.524	0.447	0.255
Decatur	0.346	0.380	0.150	0.155	0.331	0.436

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
DeKalb	0.715	0.297	0.155	0.282	0.375	0.360
Dickson	2.568	0.391	0.136	0.358	0.512	0.379
Dyer	1.684	0.522	0.288	0.365	0.478	0.414
Fayette	2.536	0.654	0.234	0.424	0.457	0.358
Fentress	0.376	0.437	0.230	0.240	0.330	0.370
Franklin	1.055	0.290	0.207	0.355	0.436	0.386
Gibson	1.148	0.520	0.359	0.356	0.485	0.363
Giles	1.470	0.334	0.124	0.337	0.416	0.337
Grainger	0.214	0.327	0.158	0.228	0.314	0.357
Greene	0.883	0.323	0.223	0.341	0.411	0.363
Grundy	0.890	0.419	0.151	0.303	0.327	0.354
Hamblen	0.108	0.188	0.471	0.244	0.406	0.336
Hamilton	0.562	0.476	0.832	0.517	0.470	0.276
Hancock	0.208	0.290	0.133	0.259	0.318	0.317
Hardeman	1.067	0.640	0.165	0.286	0.302	0.373
Hardin	1.081	0.345	0.150	0.274	0.311	0.460
Hawkins	0.706	0.350	0.169	0.317	0.362	0.319
Haywood	1.793	0.575	0.149	0.310	0.329	0.404
Henderson	1.383	0.472	0.201	0.284	0.434	0.399
Henry	2.164	0.500	0.165	0.334	0.425	0.402
Hickman	1.092	0.305	0.150	0.234	0.460	0.410
Houston	0.552	0.545	0.203	0.170	0.425	0.373
Humphreys	2.554	0.475	0.157	0.283	0.513	0.441
Jackson	0.029	0.424	0.168	0.265	0.210	0.363
Jefferson	0.798	0.381	0.252	0.291	0.442	0.360
Johnson	1.324	0.337	0.115	0.260	0.356	0.431
Knox	0.410	0.277	0.657	0.521	0.501	0.245
Lake	0.774	0.673	0.229	0.194	0.262	0.501
Lauderdale	1.311	0.397	0.184	0.314	0.300	0.480
Lawrence	1.025	0.297	0.201	0.322	0.453	0.384
Lewis	0.063	0.311	0.130	0.218	0.299	0.349
Lincoln	0.576	0.226	0.162	0.271	0.462	0.319
Loudon	0.331	0.259	0.471	0.338	0.460	0.324
Macon	0.262	0.173	0.150	0.243	0.390	0.331
Madison	1.295	0.539	0.478	0.412	0.501	0.432
Marion	0.708	0.442	0.254	0.302	0.375	0.351
Marshall	0.582	0.283	0.201	0.304	0.437	0.302
Maury	0.967	0.314	0.264	0.366	0.500	0.347
McMinn	0.656	0.357	0.368	0.356	0.442	0.349
McNairy	2.041	0.446	0.149	0.346	0.377	0.415
Meigs	-0.220	0.379	0.213	0.150	0.286	0.372

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Monroe	0.483	0.249	0.384	0.319	0.379	0.469
Montgomery	0.873	0.456	0.429	0.359	0.418	0.425
Moore	1.574	0.377	0.112	0.237	0.518	0.333
Morgan	1.107	0.369	0.154	0.286	0.431	0.347
Obion	1.663	0.418	0.229	0.336	0.449	0.461
Overton	0.652	0.305	0.145	0.253	0.425	0.326
Perry	0.323	0.263	0.112	0.203	0.381	0.345
Pickett	0.173	0.333	0.157	0.102	0.413	0.406
Polk	0.930	0.266	0.241	0.316	0.389	0.503
Putnam	0.894	0.281	0.215	0.375	0.470	0.309
Rhea	0.351	0.281	0.291	0.295	0.354	0.359
Roane	0.289	0.338	0.402	0.306	0.408	0.295
Robertson	1.831	0.530	0.254	0.355	0.492	0.392
Rutherford	0.371	0.312	0.597	0.376	0.483	0.309
Scott	0.314	0.187	0.182	0.268	0.361	0.359
Sequatchie	0.317	0.428	0.198	0.268	0.319	0.327
Sevier	0.551	0.332	0.509	0.385	0.424	0.401
Shelby	0.719	0.582	0.990	0.595	0.443	0.312
Smith	0.901	0.386	0.135	0.258	0.422	0.325
Stewart	2.304	0.528	0.147	0.250	0.338	0.532
Sullivan	0.533	0.284	0.443	0.427	0.448	0.330
Sumner	0.717	0.455	0.543	0.401	0.515	0.315
Tipton	1.056	0.567	0.365	0.354	0.413	0.377
Trousdale	0.649	0.422	0.118	0.157	0.452	0.356
Unicoi	0.533	0.140	0.159	0.258	0.403	0.458
Union	0.223	0.226	0.162	0.204	0.366	0.364
Van Buren	-0.018	0.137	0.175	0.251	0.210	0.364
Warren	0.404	0.153	0.116	0.303	0.392	0.296
Washington	0.338	0.338	0.540	0.286	0.482	0.338
Wayne	0.566	0.309	0.195	0.259	0.374	0.379
Weakley	3.270	0.507	0.124	0.321	0.502	0.390
White	0.598	0.213	0.144	0.282	0.406	0.348
Williamson	0.813	0.387	0.501	0.407	0.547	0.362
Wilson	1.143	0.443	0.414	0.423	0.566	0.337

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Area	**CRSI**	**Governance**	**Risk**	**Built Environment**	**Society**	**Natural Environment**
Region 5	**5.476**	**0.696**	**0.222**	**0.407**	**0.572**	**0.434**
Illinois	**4.561**	**0.662**	**0.242**	**0.414**	**0.515**	**0.489**
Adams	5.568	0.585	0.181	0.519	0.592	0.478
Alexander	0.466	0.576	0.279	0.175	0.176	0.575
Bond	5.471	0.703	0.126	0.345	0.470	0.464
Boone	1.471	0.677	0.471	0.378	0.453	0.458
Brown	3.680	0.629	0.095	0.249	0.415	0.439
Bureau	8.620	0.751	0.172	0.531	0.604	0.560
Calhoun	4.750	0.671	0.133	0.320	0.526	0.428
Carroll	3.081	0.641	0.224	0.336	0.511	0.478
Cass	4.928	0.677	0.117	0.283	0.449	0.493
Champaign	5.572	0.693	0.240	0.655	0.467	0.516
Christian	6.446	0.668	0.182	0.433	0.610	0.569
Clark	3.559	0.523	0.141	0.353	0.446	0.466
Clay	4.927	0.608	0.126	0.344	0.509	0.448
Clinton	5.959	0.701	0.189	0.475	0.641	0.441
Coles	3.620	0.501	0.146	0.394	0.413	0.486
Cook	1.641	0.673	0.687	0.828	0.498	0.199
Crawford	2.889	0.647	0.186	0.282	0.450	0.487
Cumberland	4.937	0.653	0.152	0.375	0.487	0.484
De Witt	2.327	0.602	0.349	0.327	0.597	0.530
DeKalb	3.705	0.704	0.273	0.511	0.515	0.433
Douglas	3.546	0.590	0.222	0.372	0.580	0.489
DuPage	1.383	0.701	0.698	0.636	0.629	0.181
Edgar	6.427	0.619	0.102	0.317	0.470	0.526
Edwards	3.622	0.660	0.144	0.245	0.566	0.418
Effingham	9.995	0.711	0.127	0.462	0.676	0.498
Fayette	7.301	0.703	0.117	0.373	0.526	0.485
Ford	10.504	0.665	0.084	0.358	0.585	0.499
Franklin	4.522	0.609	0.148	0.399	0.477	0.447
Fulton	7.392	0.661	0.149	0.477	0.543	0.539
Gallatin	2.934	0.638	0.185	0.277	0.326	0.598
Greene	4.099	0.693	0.157	0.293	0.525	0.454
Grundy	3.070	0.712	0.457	0.511	0.521	0.646
Hamilton	5.025	0.648	0.118	0.285	0.511	0.469
Hancock	5.955	0.681	0.177	0.417	0.558	0.546
Hardin	3.782	0.767	0.161	0.228	0.141	0.776
Henderson	3.744	0.762	0.263	0.348	0.535	0.533

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Henry	3.253	0.633	0.303	0.457	0.511	0.543
Iroquois	9.831	0.679	0.105	0.527	0.544	0.425
Jackson	3.724	0.559	0.215	0.468	0.424	0.549
Jasper	7.863	0.643	0.101	0.317	0.571	0.516
Jefferson	4.515	0.690	0.151	0.392	0.482	0.404
Jersey	6.736	0.644	0.113	0.350	0.545	0.478
Jo Daviess	4.529	0.693	0.216	0.404	0.617	0.455
Johnson	4.582	0.673	0.198	0.372	0.372	0.660
Kane	1.835	0.709	0.633	0.595	0.553	0.393
Kankakee	3.498	0.638	0.282	0.486	0.500	0.515
Kendall	3.163	0.734	0.354	0.447	0.594	0.475
Knox	5.308	0.659	0.175	0.406	0.448	0.589
Lake	2.011	0.687	0.621	0.613	0.540	0.458
LaSalle	5.155	0.706	0.301	0.686	0.566	0.511
Lawrence	3.478	0.601	0.162	0.279	0.490	0.499
Lee	9.234	0.667	0.128	0.523	0.538	0.537
Livingston	10.658	0.691	0.130	0.558	0.593	0.548
Logan	4.057	0.688	0.213	0.369	0.531	0.500
Macon	3.549	0.625	0.205	0.468	0.472	0.403
Macoupin	8.944	0.691	0.132	0.511	0.619	0.460
Madison	1.722	0.706	0.696	0.660	0.497	0.391
Marion	6.510	0.746	0.141	0.404	0.501	0.475
Marshall	4.795	0.659	0.183	0.351	0.634	0.467
Mason	4.782	0.653	0.150	0.342	0.505	0.487
Massac	2.049	0.516	0.216	0.296	0.436	0.494
McDonough	5.075	0.621	0.153	0.434	0.430	0.508
McHenry	1.925	0.662	0.612	0.574	0.604	0.432
McLean	6.167	0.654	0.203	0.677	0.469	0.484
Menard	6.054	0.712	0.126	0.319	0.513	0.492
Mercer	3.641	0.674	0.287	0.351	0.684	0.517
Monroe	3.240	0.635	0.242	0.422	0.563	0.408
Montgomery	7.197	0.657	0.159	0.449	0.646	0.520
Morgan	2.881	0.662	0.285	0.407	0.559	0.429
Moultrie	8.786	0.692	0.098	0.334	0.513	0.551
Ogle	4.523	0.661	0.274	0.580	0.531	0.523
Peoria	2.090	0.650	0.437	0.424	0.522	0.508
Perry	5.875	0.675	0.142	0.354	0.607	0.446
Piatt	6.937	0.719	0.130	0.400	0.558	0.445
Pike	6.633	0.720	0.149	0.404	0.538	0.503
Pope	4.759	0.621	0.225	0.272	0.529	0.796
Pulaski	0.608	0.697	0.222	0.212	0.239	0.471

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Putnam	1.377	0.767	0.508	0.346	0.484	0.422
Randolph	4.504	0.617	0.199	0.434	0.650	0.414
Richland	4.979	0.705	0.116	0.290	0.458	0.465
Rock Island	2.272	0.643	0.333	0.411	0.489	0.456
Saline	3.026	0.555	0.202	0.343	0.416	0.556
Sangamon	4.220	0.654	0.286	0.618	0.555	0.452
Schuyler	5.259	0.581	0.110	0.286	0.536	0.479
Scott	4.954	0.813	0.134	0.267	0.461	0.487
Shelby	5.994	0.636	0.156	0.390	0.570	0.531
St. Clair	1.077	0.679	0.728	0.506	0.464	0.364
Stark	5.463	0.838	0.204	0.283	0.590	0.577
Stephenson	5.137	0.698	0.159	0.355	0.557	0.460
Tazewell	2.253	0.659	0.534	0.549	0.567	0.507
Union	3.742	0.489	0.227	0.356	0.604	0.652
Vermilion	3.786	0.552	0.222	0.464	0.451	0.571
Wabash	2.836	0.631	0.151	0.290	0.395	0.459
Warren	7.124	0.761	0.139	0.321	0.517	0.581
Washington	4.753	0.764	0.184	0.402	0.513	0.433
Wayne	4.119	0.640	0.151	0.342	0.537	0.409
White	2.595	0.550	0.147	0.322	0.414	0.416
Whiteside	5.791	0.641	0.153	0.420	0.471	0.545
Will	2.081	0.678	0.779	0.776	0.576	0.484
Williamson	3.088	0.609	0.328	0.461	0.557	0.545
Winnebago	1.408	0.674	0.631	0.541	0.481	0.379
Woodford	4.250	0.668	0.242	0.449	0.641	0.442
Indiana	**5.153**	**0.659**	**0.219**	**0.360**	**0.570**	**0.452**
Adams	4.932	0.607	0.118	0.315	0.545	0.427
Allen	1.474	0.600	0.587	0.531	0.554	0.381
Bartholomew	1.937	0.605	0.340	0.322	0.552	0.466
Benton	13.290	0.682	0.069	0.341	0.609	0.506
Blackford	4.177	0.666	0.111	0.228	0.559	0.402
Boone	3.272	0.714	0.318	0.414	0.565	0.506
Brown	8.511	0.546	0.095	0.348	0.585	0.572
Carroll	6.378	0.690	0.146	0.353	0.592	0.507
Cass	6.771	0.691	0.108	0.304	0.518	0.499
Clark	0.980	0.670	0.572	0.338	0.484	0.400
Clay	5.698	0.673	0.149	0.307	0.646	0.477
Clinton	7.123	0.727	0.130	0.326	0.599	0.500
Crawford	2.185	0.663	0.191	0.191	0.525	0.442
Daviess	5.299	0.594	0.160	0.369	0.671	0.459

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Dearborn	3.413	0.714	0.237	0.330	0.606	0.432
Decatur	5.217	0.642	0.176	0.353	0.655	0.490
DeKalb	4.572	0.698	0.197	0.404	0.553	0.458
Delaware	2.322	0.664	0.216	0.316	0.485	0.391
Dubois	4.213	0.653	0.241	0.450	0.691	0.405
Elkhart	1.449	0.750	0.572	0.430	0.485	0.408
Fayette	4.939	0.712	0.106	0.240	0.501	0.451
Floyd	0.681	0.637	0.539	0.286	0.538	0.309
Fountain	8.493	0.688	0.080	0.294	0.500	0.497
Franklin	7.832	0.722	0.126	0.311	0.693	0.478
Fulton	8.504	0.545	0.089	0.329	0.653	0.501
Gibson	3.268	0.620	0.228	0.384	0.582	0.421
Grant	2.948	0.634	0.200	0.377	0.506	0.378
Greene	6.208	0.542	0.115	0.379	0.558	0.494
Hamilton	1.517	0.604	0.453	0.454	0.577	0.323
Hancock	2.055	0.686	0.406	0.376	0.616	0.408
Harrison	4.408	0.601	0.135	0.353	0.537	0.405
Hendricks	2.110	0.685	0.477	0.475	0.583	0.430
Henry	5.095	0.731	0.146	0.324	0.562	0.427
Howard	1.823	0.647	0.268	0.249	0.525	0.430
Huntington	7.416	0.654	0.121	0.396	0.611	0.452
Jackson	4.188	0.607	0.189	0.355	0.601	0.479
Jasper	11.749	0.716	0.102	0.479	0.612	0.484
Jay	4.631	0.705	0.118	0.302	0.529	0.378
Jefferson	6.849	0.729	0.133	0.335	0.539	0.526
Jennings	5.770	0.560	0.113	0.337	0.558	0.476
Johnson	1.749	0.659	0.513	0.387	0.592	0.475
Knox	3.804	0.625	0.205	0.383	0.570	0.449
Kosciusko	4.578	0.740	0.251	0.468	0.548	0.499
LaGrange	7.024	0.552	0.097	0.411	0.515	0.459
Lake	1.023	0.678	0.777	0.602	0.467	0.265
LaPorte	2.861	0.772	0.296	0.462	0.504	0.356
Lawrence	6.492	0.652	0.131	0.367	0.606	0.463
Madison	2.851	0.669	0.218	0.346	0.524	0.398
Marion	1.009	0.625	0.723	0.667	0.444	0.210
Marshall	5.834	0.599	0.164	0.440	0.615	0.497
Martin	5.946	0.577	0.129	0.300	0.576	0.571
Miami	6.795	0.743	0.115	0.283	0.563	0.485
Monroe	2.219	0.614	0.361	0.417	0.439	0.542
Montgomery	9.013	0.667	0.109	0.392	0.630	0.483
Morgan	4.860	0.664	0.213	0.465	0.566	0.493

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Newton	14.854	0.784	0.070	0.372	0.556	0.508
Noble	4.860	0.671	0.163	0.377	0.480	0.503
Ohio	4.407	0.573	0.124	0.241	0.620	0.446
Orange	4.994	0.530	0.126	0.287	0.654	0.464
Owen	3.747	0.579	0.181	0.331	0.554	0.489
Parke	9.701	0.639	0.080	0.326	0.573	0.495
Perry	5.300	0.727	0.163	0.269	0.600	0.526
Pike	5.840	0.674	0.132	0.327	0.571	0.468
Porter	1.652	0.685	0.615	0.544	0.564	0.377
Posey	4.324	0.737	0.198	0.343	0.602	0.434
Pulaski	12.135	0.669	0.074	0.342	0.647	0.470
Putnam	8.358	0.620	0.116	0.406	0.618	0.514
Randolph	7.661	0.648	0.093	0.311	0.575	0.465
Ripley	8.659	0.772	0.157	0.348	0.780	0.527
Rush	6.921	0.696	0.143	0.296	0.743	0.478
Scott	3.054	0.696	0.161	0.233	0.497	0.452
Shelby	4.544	0.683	0.186	0.323	0.599	0.487
Spencer	5.657	0.672	0.167	0.375	0.655	0.455
St. Joseph	1.575	0.673	0.513	0.480	0.473	0.403
Starke	5.839	0.706	0.105	0.344	0.469	0.418
Steuben	5.484	0.646	0.158	0.404	0.599	0.443
Sullivan	7.415	0.636	0.112	0.391	0.574	0.460
Switzerland	4.118	0.642	0.118	0.295	0.460	0.435
Tippecanoe	2.321	0.589	0.344	0.469	0.501	0.457
Tipton	10.332	0.616	0.079	0.318	0.696	0.454
Union	5.558	0.681	0.094	0.244	0.465	0.491
Vanderburgh	0.556	0.603	0.752	0.278	0.549	0.355
Vermillion	3.657	0.684	0.181	0.288	0.537	0.467
Vigo	2.009	0.622	0.332	0.357	0.525	0.442
Wabash	9.771	0.670	0.099	0.365	0.667	0.475
Warren	8.347	0.689	0.102	0.310	0.541	0.546
Warrick	2.817	0.672	0.324	0.404	0.632	0.423
Washington	5.500	0.637	0.119	0.313	0.571	0.433
Wayne	3.372	0.664	0.184	0.319	0.534	0.422
Wells	5.983	0.674	0.129	0.308	0.611	0.457
White	8.785	0.670	0.120	0.447	0.587	0.502
Whitley	4.188	0.694	0.183	0.324	0.573	0.455
Michigan	**5.939**	**0.705**	**0.177**	**0.412**	**0.492**	**0.418**
Alcona	7.999	0.702	0.086	0.347	0.474	0.457
Alger	6.418	0.583	0.104	0.301	0.602	0.473

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Allegan	6.546	0.650	0.135	0.510	0.555	0.372
Alpena	6.390	0.729	0.131	0.354	0.516	0.485
Antrim	5.528	0.728	0.129	0.387	0.499	0.395
Arenac	10.083	0.732	0.066	0.369	0.492	0.389
Baraga	3.106	0.619	0.255	0.380	0.555	0.480
Barry	10.447	0.670	0.068	0.447	0.487	0.372
Bay	3.440	0.690	0.186	0.408	0.506	0.345
Benzie	6.497	0.699	0.106	0.365	0.566	0.366
Berrien	3.265	0.708	0.216	0.513	0.375	0.363
Branch	4.145	0.662	0.133	0.373	0.414	0.417
Calhoun	2.384	0.742	0.250	0.384	0.425	0.385
Cass	2.771	0.723	0.187	0.363	0.358	0.426
Charlevoix	5.438	0.745	0.138	0.384	0.594	0.333
Cheboygan	10.002	0.686	0.095	0.447	0.561	0.446
Chippewa	9.257	0.762	0.098	0.490	0.480	0.381
Clare	8.214	0.839	0.082	0.368	0.427	0.401
Clinton	5.429	0.695	0.165	0.431	0.600	0.390
Crawford	6.001	0.567	0.133	0.344	0.442	0.660
Delta	10.163	0.735	0.105	0.445	0.603	0.440
Dickinson	6.106	0.682	0.203	0.418	0.691	0.546
Eaton	3.769	0.756	0.234	0.431	0.533	0.395
Emmet	8.298	0.706	0.141	0.410	0.649	0.523
Genesee	0.921	0.591	0.511	0.438	0.415	0.331
Gladwin	9.357	0.588	0.065	0.378	0.421	0.485
Gogebic	5.478	0.666	0.125	0.270	0.532	0.516
Grand Traverse	4.157	0.692	0.205	0.407	0.603	0.393
Gratiot	6.946	0.832	0.114	0.406	0.466	0.386
Hillsdale	5.464	0.753	0.084	0.311	0.441	0.370
Houghton	3.939	0.660	0.164	0.335	0.533	0.423
Huron	13.117	0.792	0.082	0.513	0.594	0.335
Ingham	1.908	0.669	0.328	0.442	0.480	0.332
Ionia	4.796	0.695	0.132	0.371	0.481	0.398
Iosco	5.399	0.700	0.131	0.349	0.497	0.450
Iron	5.873	0.701	0.169	0.330	0.653	0.510
Isabella	8.512	0.754	0.114	0.446	0.416	0.522
Jackson	3.626	0.685	0.161	0.367	0.484	0.376
Kalamazoo	1.547	0.659	0.410	0.423	0.473	0.369
Kalkaska	14.188	0.846	0.073	0.384	0.425	0.558
Kent	2.224	0.682	0.450	0.622	0.523	0.319
Keweenaw	1.809	0.824	0.222	0.311	0.279	0.451
Lake	7.407	0.708	0.109	0.341	0.444	0.553

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Lapeer	5.369	0.707	0.136	0.383	0.513	0.407
Leelanau	3.669	0.770	0.243	0.384	0.622	0.371
Lenawee	4.896	0.758	0.168	0.424	0.497	0.398
Livingston	2.487	0.728	0.374	0.446	0.617	0.358
Luce	2.443	0.749	0.226	0.280	0.389	0.500
Mackinac	8.331	0.773	0.103	0.423	0.513	0.394
Macomb	1.179	0.674	0.587	0.520	0.501	0.267
Manistee	4.463	0.693	0.144	0.328	0.522	0.418
Marquette	4.201	0.613	0.276	0.609	0.593	0.448
Mason	5.944	0.782	0.130	0.347	0.520	0.424
Mecosta	8.961	0.671	0.070	0.398	0.431	0.417
Menominee	6.193	0.805	0.099	0.376	0.425	0.375
Midland	4.703	0.685	0.137	0.356	0.527	0.389
Missaukee	11.971	0.770	0.073	0.368	0.471	0.502
Monroe	1.382	0.665	0.361	0.455	0.488	0.235
Montcalm	8.655	0.786	0.086	0.432	0.434	0.382
Montmorency	8.142	0.700	0.092	0.365	0.414	0.524
Muskegon	2.383	0.631	0.194	0.356	0.430	0.382
Newaygo	11.919	0.728	0.075	0.417	0.445	0.501
Oakland	1.845	0.648	0.557	0.723	0.523	0.256
Oceana	13.909	0.677	0.046	0.390	0.511	0.368
Ogemaw	5.104	0.715	0.150	0.363	0.452	0.493
Ontonagon	2.868	0.658	0.237	0.270	0.582	0.476
Osceola	10.986	0.790	0.073	0.409	0.448	0.424
Oscoda	4.737	0.618	0.123	0.351	0.317	0.563
Otsego	8.667	0.714	0.110	0.379	0.562	0.499
Ottawa	4.399	0.732	0.247	0.584	0.588	0.314
Presque Isle	4.783	0.718	0.129	0.355	0.436	0.430
Roscommon	9.028	0.677	0.090	0.388	0.395	0.567
Saginaw	4.168	0.627	0.180	0.510	0.439	0.396
Sanilac	12.192	0.773	0.083	0.467	0.451	0.477
Schoolcraft	6.955	0.687	0.121	0.350	0.496	0.535
Shiawassee	5.805	0.739	0.120	0.373	0.515	0.380
St. Clair	5.042	0.692	0.188	0.541	0.480	0.403
St. Joseph	3.664	0.708	0.162	0.403	0.376	0.416
Tuscola	9.652	0.680	0.093	0.490	0.509	0.415
Van Buren	2.904	0.617	0.162	0.425	0.453	0.301
Washtenaw	2.234	0.708	0.405	0.546	0.477	0.360
Wayne	0.941	0.663	0.608	0.651	0.373	0.160
Wexford	7.379	0.705	0.135	0.414	0.565	0.486

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Minnesota	**7.125**	**0.772**	**0.220**	**0.389**	**0.735**	**0.442**
Aitkin	9.811	0.798	0.126	0.352	0.696	0.508
Anoka	1.080	0.700	0.655	0.358	0.673	0.299
Becker	11.035	0.804	0.154	0.455	0.769	0.567
Beltrami	8.976	0.711	0.172	0.515	0.654	0.616
Benton	4.470	0.794	0.208	0.343	0.745	0.323
Big Stone	8.121	0.835	0.096	0.187	0.649	0.472
Blue Earth	4.504	0.737	0.285	0.462	0.743	0.427
Brown	7.449	0.711	0.142	0.358	0.822	0.375
Carlton	6.576	0.748	0.190	0.444	0.673	0.473
Carver	2.275	0.736	0.480	0.429	0.688	0.403
Cass	11.914	0.812	0.134	0.468	0.631	0.599
Chippewa	6.123	0.873	0.207	0.273	0.815	0.456
Chisago	5.958	0.756	0.201	0.421	0.724	0.421
Clay	7.735	0.689	0.157	0.531	0.661	0.424
Clearwater	8.179	0.862	0.140	0.238	0.622	0.601
Cook	10.545	0.740	0.120	0.318	0.913	0.434
Cottonwood	3.482	0.707	0.273	0.339	0.799	0.354
Crow Wing	6.314	0.738	0.175	0.420	0.703	0.406
Dakota	1.671	0.664	0.672	0.552	0.632	0.397
Dodge	8.997	0.774	0.143	0.353	0.823	0.449
Douglas	6.746	0.771	0.199	0.376	0.836	0.445
Faribault	9.614	0.763	0.147	0.400	0.830	0.473
Fillmore	13.448	0.864	0.131	0.362	0.832	0.588
Freeborn	3.353	0.766	0.327	0.353	0.695	0.458
Goodhue	7.162	0.695	0.169	0.424	0.753	0.460
Grant	12.032	0.752	0.104	0.361	0.886	0.391
Hennepin	1.475	0.665	0.748	0.692	0.607	0.254
Houston	8.833	0.779	0.169	0.384	0.723	0.599
Hubbard	8.164	0.766	0.120	0.298	0.729	0.427
Isanti	5.363	0.755	0.160	0.347	0.672	0.363
Itasca	16.343	0.745	0.106	0.534	0.692	0.630
Jackson	8.388	0.758	0.185	0.442	0.826	0.508
Kanabec	6.329	0.840	0.140	0.260	0.733	0.375
Kandiyohi	6.682	0.782	0.204	0.462	0.739	0.429
Kittson	7.940	0.751	0.136	0.386	0.724	0.402
Koochiching	13.669	0.697	0.099	0.429	0.628	0.635
Lac qui Parle	5.516	0.846	0.233	0.272	0.847	0.458
Lake	10.333	0.645	0.121	0.359	0.699	0.653
Lake of the Woods	8.091	0.701	0.162	0.249	0.848	0.628
Le Sueur	4.655	0.834	0.241	0.317	0.754	0.415

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Lincoln	19.250	0.862	0.076	0.351	0.935	0.376
Lyon	10.965	0.761	0.116	0.455	0.846	0.324
Mahnomen	5.220	0.817	0.236	0.319	0.380	0.778
Marshall	11.660	0.882	0.136	0.486	0.710	0.449
Martin	9.469	0.802	0.144	0.392	0.765	0.469
McLeod	6.964	0.756	0.177	0.373	0.788	0.441
Meeker	5.382	0.869	0.229	0.334	0.776	0.409
Mille Lacs	7.765	0.771	0.144	0.351	0.776	0.404
Morrison	12.485	0.832	0.111	0.408	0.794	0.414
Mower	10.109	0.755	0.117	0.457	0.640	0.446
Murray	8.648	0.837	0.142	0.345	0.810	0.389
Nicollet	3.893	0.721	0.232	0.341	0.682	0.407
Nobles	5.500	0.809	0.231	0.460	0.681	0.410
Norman	5.217	0.830	0.220	0.340	0.744	0.413
Olmsted	2.727	0.688	0.423	0.505	0.667	0.414
Otter Tail	7.984	0.827	0.195	0.562	0.754	0.366
Pennington	8.151	0.739	0.129	0.348	0.738	0.427
Pine	9.063	0.781	0.126	0.362	0.705	0.452
Pipestone	13.755	0.689	0.078	0.391	0.786	0.396
Polk	9.813	0.751	0.153	0.599	0.704	0.414
Pope	6.228	0.843	0.176	0.273	0.791	0.414
Ramsey	0.807	0.666	0.621	0.448	0.607	0.149
Red Lake	5.106	0.769	0.152	0.313	0.597	0.407
Redwood	9.590	0.852	0.144	0.351	0.825	0.431
Renville	6.358	0.936	0.238	0.342	0.853	0.419
Rice	3.250	0.706	0.303	0.392	0.692	0.404
Rock	5.375	0.768	0.187	0.370	0.670	0.410
Roseau	5.202	0.773	0.278	0.441	0.794	0.462
Scott	2.059	0.729	0.504	0.421	0.666	0.404
Sherburne	2.200	0.689	0.472	0.411	0.770	0.366
Sibley	6.258	0.767	0.187	0.333	0.795	0.438
St. Louis	10.592	0.671	0.165	0.861	0.607	0.453
Stearns	5.040	0.774	0.314	0.587	0.746	0.412
Steele	2.559	0.712	0.389	0.376	0.708	0.408
Stevens	5.011	0.759	0.229	0.322	0.843	0.405
Swift	5.064	0.766	0.213	0.310	0.783	0.426
Todd	4.762	0.781	0.161	0.288	0.657	0.375
Traverse	2.327	0.771	0.162	0.093	0.645	0.397
Wabasha	9.016	0.751	0.154	0.320	0.792	0.584
Wadena	4.373	0.811	0.215	0.279	0.726	0.401
Waseca	6.830	0.766	0.152	0.315	0.746	0.429

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Washington	1.849	0.711	0.536	0.426	0.683	0.373
Watonwan	4.507	0.831	0.231	0.341	0.690	0.401
Wilkin	11.916	0.933	0.134	0.368	0.870	0.415
Winona	9.077	0.764	0.149	0.398	0.628	0.598
Wright	3.048	0.758	0.455	0.469	0.762	0.440
Yellow Medicine	8.103	0.927	0.185	0.336	0.818	0.454
Ohio	**3.446**	**0.651**	**0.246**	**0.421**	**0.514**	**0.352**
Adams	3.033	0.598	0.129	0.365	0.387	0.375
Allen	2.404	0.650	0.271	0.405	0.554	0.339
Ashland	5.372	0.637	0.134	0.421	0.540	0.385
Ashtabula	2.435	0.613	0.220	0.427	0.466	0.335
Athens	2.194	0.577	0.193	0.436	0.388	0.329
Auglaize	5.451	0.645	0.143	0.431	0.583	0.373
Belmont	3.083	0.631	0.177	0.403	0.504	0.325
Brown	3.342	0.632	0.147	0.358	0.477	0.362
Butler	1.108	0.662	0.625	0.526	0.508	0.262
Carroll	4.409	0.627	0.115	0.354	0.549	0.319
Champaign	6.413	0.643	0.111	0.396	0.477	0.453
Clark	1.573	0.649	0.313	0.321	0.482	0.389
Clermont	1.358	0.631	0.346	0.352	0.524	0.317
Clinton	1.814	0.576	0.223	0.365	0.463	0.333
Columbiana	2.248	0.675	0.237	0.379	0.506	0.320
Coshocton	4.046	0.660	0.130	0.370	0.495	0.341
Crawford	4.891	0.703	0.163	0.357	0.554	0.443
Cuyahoga	1.704	0.627	0.502	0.710	0.490	0.207
Darke	5.336	0.687	0.171	0.413	0.591	0.432
Defiance	5.939	0.632	0.120	0.368	0.623	0.374
Delaware	2.277	0.691	0.418	0.457	0.522	0.461
Erie	2.580	0.664	0.228	0.413	0.507	0.321
Fairfield	2.505	0.661	0.330	0.457	0.517	0.413
Fayette	3.316	0.641	0.194	0.386	0.510	0.396
Franklin	1.276	0.635	0.662	0.671	0.463	0.256
Fulton	4.898	0.679	0.170	0.424	0.669	0.320
Gallia	1.810	0.574	0.170	0.372	0.351	0.347
Geauga	3.522	0.599	0.262	0.481	0.612	0.428
Greene	1.280	0.651	0.480	0.412	0.460	0.383
Guernsey	4.330	0.709	0.158	0.433	0.513	0.325
Hamilton	0.924	0.609	0.557	0.571	0.502	0.137
Hancock	3.282	0.673	0.249	0.455	0.545	0.379
Hardin	9.517	0.726	0.083	0.355	0.522	0.453

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Harrison	4.509	0.664	0.090	0.349	0.477	0.303
Henry	8.193	0.774	0.116	0.393	0.641	0.376
Highland	4.425	0.673	0.114	0.292	0.552	0.360
Hocking	4.345	0.621	0.132	0.370	0.529	0.366
Holmes	5.595	0.650	0.123	0.395	0.656	0.293
Huron	6.240	0.673	0.141	0.447	0.539	0.430
Jackson	2.868	0.646	0.150	0.362	0.461	0.323
Jefferson	1.610	0.625	0.221	0.381	0.443	0.277
Knox	6.219	0.702	0.108	0.398	0.520	0.356
Lake	1.812	0.642	0.302	0.361	0.587	0.300
Lawrence	1.489	0.646	0.286	0.384	0.365	0.374
Licking	3.253	0.688	0.266	0.460	0.528	0.404
Logan	5.960	0.623	0.117	0.429	0.548	0.366
Lorain	1.291	0.649	0.519	0.498	0.492	0.300
Lucas	0.847	0.640	0.521	0.483	0.476	0.190
Madison	5.194	0.638	0.139	0.392	0.516	0.434
Mahoning	1.859	0.668	0.368	0.460	0.525	0.312
Marion	2.370	0.560	0.213	0.341	0.457	0.445
Medina	1.773	0.637	0.444	0.424	0.614	0.365
Meigs	1.163	0.612	0.204	0.334	0.351	0.328
Mercer	10.150	0.719	0.103	0.406	0.681	0.422
Miami	1.786	0.653	0.365	0.354	0.567	0.384
Monroe	3.722	0.692	0.123	0.342	0.475	0.333
Montgomery	0.996	0.608	0.666	0.544	0.479	0.284
Morgan	2.179	0.623	0.161	0.333	0.474	0.303
Morrow	5.430	0.612	0.094	0.337	0.481	0.402
Muskingum	2.505	0.674	0.212	0.389	0.492	0.318
Noble	2.780	0.588	0.125	0.334	0.476	0.311
Ottawa	2.432	0.645	0.225	0.375	0.579	0.289
Paulding	5.471	0.670	0.119	0.425	0.493	0.356
Perry	3.094	0.681	0.163	0.420	0.393	0.345
Pickaway	4.060	0.642	0.212	0.480	0.508	0.432
Pike	3.475	0.701	0.155	0.395	0.425	0.359
Portage	2.096	0.683	0.417	0.476	0.508	0.412
Preble	4.379	0.627	0.131	0.374	0.448	0.423
Putnam	6.349	0.757	0.159	0.423	0.723	0.318
Richland	3.475	0.626	0.231	0.489	0.567	0.351
Ross	3.538	0.591	0.167	0.443	0.432	0.394
Sandusky	3.326	0.562	0.188	0.438	0.573	0.332
Scioto	2.442	0.597	0.198	0.448	0.372	0.360
Seneca	4.981	0.778	0.180	0.397	0.565	0.401

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Shelby	3.975	0.659	0.161	0.377	0.564	0.350
Stark	1.467	0.612	0.497	0.548	0.545	0.268
Summit	1.045	0.647	0.633	0.514	0.543	0.238
Trumbull	2.578	0.662	0.310	0.491	0.468	0.398
Tuscarawas	2.931	0.665	0.260	0.490	0.558	0.301
Union	3.947	0.672	0.198	0.429	0.527	0.402
Van Wert	2.346	0.711	0.270	0.336	0.531	0.388
Vinton	2.068	0.610	0.162	0.333	0.363	0.385
Warren	1.007	0.644	0.644	0.408	0.529	0.357
Washington	3.024	0.619	0.208	0.469	0.484	0.332
Wayne	4.164	0.657	0.260	0.550	0.635	0.382
Williams	6.116	0.684	0.138	0.468	0.535	0.379
Wood	2.952	0.687	0.354	0.594	0.529	0.367
Wyandot	6.245	0.723	0.133	0.391	0.555	0.413
Wisconsin	**7.140**	**0.746**	**0.220**	**0.457**	**0.623**	**0.441**
Adams	4.533	0.672	0.161	0.423	0.506	0.394
Ashland	11.999	0.802	0.107	0.364	0.737	0.484
Barron	7.481	0.796	0.173	0.429	0.704	0.449
Bayfield	8.767	0.762	0.113	0.309	0.640	0.497
Brown	2.072	0.735	0.587	0.599	0.608	0.351
Buffalo	8.072	0.863	0.119	0.365	0.599	0.393
Burnett	2.454	0.727	0.325	0.253	0.582	0.520
Calumet	2.894	0.691	0.350	0.443	0.623	0.431
Chippewa	5.956	0.697	0.210	0.576	0.624	0.420
Clark	10.816	0.590	0.102	0.491	0.668	0.508
Columbia	4.530	0.758	0.309	0.578	0.653	0.417
Crawford	7.014	0.800	0.138	0.376	0.641	0.384
Dane	2.727	0.673	0.572	0.803	0.623	0.388
Dodge	6.097	0.720	0.236	0.603	0.624	0.475
Door	11.358	0.681	0.107	0.507	0.732	0.407
Douglas	5.774	0.785	0.183	0.409	0.570	0.461
Dunn	10.202	0.810	0.123	0.519	0.630	0.377
Eau Claire	3.966	0.754	0.264	0.470	0.590	0.396
Florence	16.089	0.954	0.081	0.347	0.472	0.617
Fond du Lac	5.726	0.737	0.237	0.538	0.647	0.463
Forest	13.330	0.779	0.098	0.359	0.613	0.616
Grant	10.607	0.770	0.151	0.663	0.679	0.397
Green	4.055	0.765	0.248	0.424	0.667	0.354
Green Lake	7.829	0.789	0.134	0.345	0.689	0.430
Iowa	10.844	0.828	0.115	0.475	0.699	0.353

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Iron	11.109	0.784	0.094	0.321	0.661	0.480
Jackson	11.614	0.767	0.094	0.408	0.599	0.470
Jefferson	4.327	0.730	0.297	0.525	0.636	0.452
Juneau	6.166	0.654	0.158	0.464	0.570	0.460
Kenosha	1.409	0.627	0.472	0.421	0.477	0.407
Kewaunee	7.562	0.700	0.140	0.373	0.698	0.465
La Crosse	2.458	0.656	0.377	0.455	0.600	0.416
Lafayette	9.550	0.782	0.117	0.425	0.713	0.366
Langlade	9.330	0.735	0.116	0.330	0.655	0.533
Lincoln	5.770	0.748	0.209	0.400	0.672	0.497
Manitowoc	3.555	0.746	0.324	0.487	0.628	0.413
Marathon	5.490	0.621	0.243	0.703	0.615	0.432
Marinette	9.129	0.672	0.124	0.583	0.560	0.422
Marquette	9.450	0.787	0.115	0.422	0.655	0.393
Menominee	2.719	0.700	0.269	0.331	0.193	0.725
Milwaukee	2.410	0.666	0.363	0.564	0.467	0.363
Monroe	7.830	0.770	0.156	0.511	0.616	0.411
Oconto	9.305	0.832	0.137	0.491	0.634	0.398
Oneida	14.162	0.703	0.096	0.498	0.691	0.509
Outagamie	2.625	0.717	0.558	0.603	0.690	0.438
Ozaukee	3.323	0.664	0.266	0.347	0.646	0.463
Pepin	5.268	0.981	0.171	0.295	0.592	0.395
Pierce	4.407	0.759	0.248	0.423	0.678	0.399
Polk	11.957	0.799	0.114	0.416	0.729	0.473
Portage	6.917	0.783	0.164	0.499	0.618	0.367
Price	13.610	0.714	0.092	0.409	0.735	0.499
Racine	1.644	0.666	0.443	0.374	0.543	0.419
Richland	9.231	0.701	0.086	0.382	0.610	0.375
Rock	3.392	0.699	0.320	0.566	0.516	0.419
Rusk	4.822	0.747	0.185	0.340	0.568	0.477
Sauk	7.189	0.726	0.174	0.566	0.659	0.375
Sawyer	14.673	0.825	0.080	0.308	0.586	0.593
Shawano	13.389	0.747	0.091	0.503	0.639	0.418
Sheboygan	4.710	0.711	0.227	0.460	0.616	0.434
St. Croix	4.311	0.761	0.312	0.520	0.673	0.431
Taylor	11.802	0.834	0.098	0.385	0.628	0.460
Trempealeau	10.594	0.840	0.113	0.476	0.594	0.401
Vernon	8.075	0.762	0.119	0.408	0.643	0.371
Vilas	13.874	0.810	0.113	0.436	0.611	0.640
Walworth	2.856	0.683	0.370	0.510	0.519	0.474
Washburn	13.514	0.829	0.086	0.324	0.663	0.500

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Washington	2.180	0.674	0.494	0.463	0.706	0.398
Waukesha	1.899	0.701	0.609	0.522	0.671	0.381
Waupaca	8.698	0.790	0.152	0.509	0.726	0.365
Waushara	4.208	0.793	0.247	0.454	0.606	0.370
Winnebago	1.730	0.669	0.535	0.460	0.578	0.416
Wood	4.618	0.698	0.258	0.540	0.631	0.417

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 6	**3.060**	**0.584**	**0.239**	**0.394**	**0.474**	**0.422**
Arkansas	**2.668**	**0.533**	**0.235**	**0.393**	**0.451**	**0.445**
Arkansas	3.820	0.577	0.216	0.395	0.566	0.513
Ashley	4.147	0.533	0.139	0.346	0.527	0.456
Baxter	3.380	0.489	0.180	0.433	0.455	0.486
Benton	1.568	0.524	0.596	0.710	0.466	0.396
Boone	3.461	0.512	0.171	0.383	0.585	0.401
Bradley	2.627	0.409	0.123	0.309	0.416	0.468
Calhoun	3.076	0.609	0.150	0.310	0.379	0.483
Carroll	4.470	0.498	0.114	0.482	0.484	0.319
Chicot	1.746	0.560	0.165	0.267	0.387	0.424
Clark	4.836	0.495	0.134	0.407	0.546	0.469
Clay	2.893	0.594	0.164	0.366	0.424	0.402
Cleburne	1.799	0.600	0.352	0.421	0.490	0.395
Cleveland	2.031	0.528	0.119	0.301	0.329	0.412
Columbia	2.736	0.559	0.229	0.384	0.494	0.457
Conway	2.380	0.648	0.259	0.357	0.516	0.401
Craighead	2.665	0.532	0.281	0.542	0.487	0.410
Crawford	4.860	0.557	0.177	0.519	0.474	0.499
Crittenden	1.538	0.676	0.469	0.427	0.419	0.449
Cross	4.306	0.673	0.182	0.375	0.558	0.435
Dallas	1.906	0.429	0.140	0.257	0.487	0.398
Desha	1.788	0.605	0.232	0.307	0.379	0.457
Drew	3.640	0.567	0.114	0.351	0.385	0.424
Faulkner	1.464	0.628	0.505	0.461	0.494	0.398
Franklin	2.781	0.494	0.214	0.392	0.411	0.551
Fulton	1.716	0.429	0.185	0.360	0.438	0.374
Garland	1.428	0.460	0.345	0.426	0.441	0.435
Grant	4.859	0.621	0.123	0.394	0.422	0.440

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Greene	1.799	0.589	0.274	0.416	0.429	0.360
Hempstead	1.664	0.451	0.308	0.468	0.397	0.451
Hot Spring	3.079	0.471	0.143	0.356	0.487	0.419
Howard	1.219	0.468	0.299	0.362	0.389	0.427
Independence	2.508	0.499	0.199	0.461	0.460	0.354
Izard	1.407	0.445	0.266	0.379	0.485	0.356
Jackson	2.143	0.567	0.278	0.398	0.458	0.444
Jefferson	4.122	0.539	0.161	0.447	0.442	0.475
Johnson	3.113	0.573	0.233	0.387	0.373	0.611
Lafayette	1.482	0.666	0.251	0.238	0.406	0.458
Lawrence	2.250	0.520	0.185	0.368	0.413	0.410
Lee	1.702	0.536	0.142	0.215	0.378	0.461
Lincoln	2.312	0.473	0.127	0.286	0.369	0.460
Little River	1.970	0.520	0.260	0.364	0.406	0.495
Logan	4.224	0.556	0.171	0.402	0.534	0.481
Lonoke	2.929	0.603	0.319	0.536	0.511	0.455
Madison	2.536	0.457	0.128	0.359	0.392	0.399
Marion	1.686	0.430	0.225	0.380	0.442	0.408
Miller	1.076	0.451	0.389	0.324	0.467	0.466
Mississippi	4.030	0.596	0.172	0.492	0.450	0.394
Monroe	3.072	0.651	0.230	0.324	0.511	0.497
Montgomery	3.243	0.452	0.145	0.324	0.412	0.555
Nevada	1.641	0.472	0.208	0.299	0.461	0.416
Newton	1.714	0.508	0.258	0.355	0.329	0.521
Ouachita	2.953	0.484	0.141	0.315	0.465	0.450
Perry	4.582	0.690	0.175	0.352	0.503	0.504
Phillips	2.083	0.543	0.131	0.279	0.307	0.471
Pike	4.136	0.564	0.144	0.367	0.471	0.469
Poinsett	4.563	0.623	0.126	0.404	0.419	0.416
Polk	1.360	0.333	0.323	0.372	0.540	0.516
Pope	4.192	0.545	0.177	0.450	0.470	0.504
Prairie	3.033	0.658	0.244	0.365	0.514	0.464
Pulaski	1.185	0.546	0.880	0.726	0.536	0.374
Randolph	3.596	0.551	0.144	0.375	0.500	0.390
Saline	2.045	0.581	0.419	0.485	0.521	0.471
Scott	5.446	0.601	0.151	0.349	0.511	0.584
Searcy	1.008	0.487	0.249	0.338	0.356	0.373
Sebastian	1.942	0.564	0.353	0.457	0.452	0.451
Sevier	0.562	0.203	0.263	0.341	0.326	0.480
Sharp	2.093	0.433	0.206	0.380	0.554	0.364
St. Francis	5.139	0.624	0.135	0.378	0.479	0.473

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Stone	0.986	0.288	0.247	0.356	0.441	0.419
Union	2.235	0.558	0.338	0.452	0.522	0.458
Van Buren	1.616	0.583	0.331	0.400	0.458	0.387
Washington	2.490	0.513	0.322	0.668	0.458	0.359
White	2.804	0.615	0.292	0.515	0.463	0.427
Woodruff	1.573	0.623	0.219	0.310	0.263	0.492
Yell	3.653	0.503	0.179	0.414	0.423	0.556
Louisiana	**2.501**	**0.570**	**0.338**	**0.430**	**0.479**	**0.457**
Acadia	2.915	0.535	0.271	0.493	0.480	0.496
Allen	2.317	0.549	0.295	0.372	0.470	0.540
Ascension	0.889	0.584	0.907	0.461	0.558	0.429
Assumption	1.627	0.649	0.354	0.331	0.439	0.465
Avoyelles	2.668	0.617	0.316	0.445	0.472	0.508
Beauregard	2.922	0.614	0.261	0.442	0.448	0.482
Bienville	1.799	0.553	0.259	0.356	0.408	0.445
Bossier	1.484	0.568	0.477	0.446	0.474	0.459
Caddo	1.763	0.550	0.611	0.686	0.532	0.442
Calcasieu	2.502	0.510	0.467	0.770	0.557	0.465
Caldwell	3.485	0.532	0.129	0.350	0.395	0.464
Cameron	1.388	0.583	0.503	0.386	0.516	0.470
Catahoula	1.972	0.530	0.149	0.267	0.318	0.496
Claiborne	1.022	0.514	0.228	0.230	0.408	0.422
Concordia	3.010	0.518	0.160	0.342	0.374	0.523
De Soto	4.545	0.638	0.183	0.468	0.475	0.459
East Baton Rouge	1.325	0.553	0.666	0.589	0.588	0.354
East Carroll	0.897	0.543	0.293	0.210	0.377	0.482
East Feliciana	1.270	0.566	0.265	0.364	0.363	0.371
Evangeline	2.070	0.554	0.257	0.359	0.421	0.480
Franklin	4.685	0.553	0.125	0.348	0.504	0.462
Grant	6.240	0.560	0.132	0.452	0.426	0.579
Iberia	1.417	0.506	0.360	0.399	0.454	0.429
Iberville	1.600	0.605	0.524	0.427	0.584	0.448
Jackson	1.888	0.515	0.244	0.318	0.521	0.416
Jefferson	1.347	0.632	0.626	0.483	0.578	0.371
Jefferson Davis	1.949	0.508	0.314	0.403	0.477	0.485
La Salle	5.079	0.681	0.156	0.392	0.487	0.472
Lafayette	1.564	0.564	0.655	0.596	0.588	0.437
Lafourche	1.601	0.538	0.442	0.521	0.484	0.397
Lincoln	2.068	0.536	0.255	0.432	0.400	0.426
Livingston	1.392	0.553	0.515	0.495	0.476	0.423

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Madison	2.752	0.568	0.224	0.265	0.494	0.573
Morehouse	5.154	0.618	0.146	0.364	0.481	0.528
Natchitoches	5.113	0.605	0.171	0.485	0.418	0.543
Orleans	0.694	0.626	0.692	0.388	0.398	0.386
Ouachita	2.257	0.570	0.406	0.551	0.535	0.443
Plaquemines	2.280	0.603	0.338	0.532	0.486	0.368
Pointe Coupee	2.348	0.609	0.352	0.434	0.537	0.465
Rapides	4.264	0.592	0.313	0.717	0.559	0.507
Red River	2.446	0.517	0.202	0.353	0.448	0.462
Richland	4.671	0.520	0.129	0.315	0.574	0.483
Sabine	5.044	0.621	0.119	0.420	0.430	0.408
St. Bernard	2.222	0.693	0.321	0.450	0.519	0.330
St. Charles	1.642	0.629	0.554	0.437	0.589	0.457
St. Helena	1.305	0.384	0.206	0.290	0.443	0.430
St. James	1.549	0.617	0.473	0.362	0.550	0.464
St. John the Baptist	1.591	0.621	0.484	0.392	0.595	0.416
St. Landry	3.488	0.553	0.261	0.547	0.510	0.481
St. Martin	1.814	0.511	0.345	0.416	0.529	0.437
St. Mary	2.304	0.534	0.351	0.501	0.541	0.453
St. Tammany	0.968	0.410	0.698	0.597	0.518	0.423
Tangipahoa	2.005	0.569	0.404	0.573	0.438	0.422
Tensas	1.712	0.564	0.269	0.344	0.300	0.532
Terrebonne	1.800	0.535	0.335	0.475	0.491	0.364
Union	3.218	0.551	0.207	0.377	0.475	0.517
Vermilion	2.519	0.653	0.350	0.500	0.443	0.467
Vernon	4.454	0.655	0.215	0.498	0.412	0.538
Washington	0.882	0.302	0.254	0.348	0.371	0.441
Webster	3.840	0.690	0.234	0.449	0.497	0.460
West Baton Rouge	1.721	0.584	0.596	0.451	0.691	0.487
West Carroll	5.039	0.701	0.113	0.328	0.367	0.495
West Feliciana	2.169	0.712	0.314	0.370	0.490	0.409
Winn	4.071	0.561	0.145	0.364	0.464	0.475
New Mexico	**6.490**	**0.621**	**0.166**	**0.472**	**0.505**	**0.498**
Bernalillo	1.949	0.609	0.581	0.611	0.557	0.461
Catron	4.783	0.586	0.179	0.394	0.504	0.576
Chaves	3.253	0.568	0.283	0.554	0.511	0.465
Cibola	7.995	0.593	0.100	0.429	0.454	0.534
Colfax	6.315	0.669	0.155	0.463	0.553	0.465
Curry	3.256	0.593	0.190	0.482	0.528	0.293
De Baca	5.443	0.814	0.132	0.258	0.583	0.427

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Do?a Ana	8.704	0.609	0.175	0.736	0.497	0.635
Eddy	5.114	0.526	0.204	0.540	0.490	0.645
Grant	10.633	0.604	0.114	0.530	0.646	0.535
Guadalupe	5.862	0.702	0.104	0.330	0.585	0.341
Harding	0.429	0.752	0.087	0.206	0.299	0.372
Hidalgo	4.926	0.573	0.099	0.298	0.336	0.567
Lea	5.582	0.611	0.180	0.570	0.469	0.490
Lincoln	4.285	0.543	0.248	0.576	0.603	0.502
Los Alamos	1.152	0.344	0.365	0.256	0.596	0.557
Luna	11.857	0.627	0.077	0.472	0.349	0.617
McKinley	12.664	0.625	0.095	0.624	0.469	0.541
Mora	2.648	0.695	0.118	0.329	0.411	0.310
Otero	10.251	0.542	0.110	0.601	0.438	0.659
Quay	7.873	0.724	0.116	0.412	0.608	0.392
Rio Arriba	10.097	0.629	0.134	0.619	0.553	0.574
Roosevelt	1.837	0.569	0.221	0.372	0.487	0.311
San Juan	12.005	0.615	0.122	0.693	0.519	0.620
San Miguel	5.675	0.648	0.130	0.467	0.435	0.423
Sandoval	10.102	0.724	0.147	0.642	0.510	0.544
Santa Fe	7.908	0.640	0.157	0.592	0.629	0.458
Sierra	11.673	0.567	0.087	0.360	0.484	0.762
Socorro	3.522	0.619	0.249	0.446	0.398	0.589
Taos	8.605	0.555	0.106	0.545	0.562	0.443
Torrance	7.751	0.675	0.102	0.430	0.516	0.411
Union	3.766	0.711	0.145	0.234	0.592	0.398
Valencia	6.263	0.634	0.164	0.507	0.490	0.534
Oklahoma	**3.179**	**0.649**	**0.244**	**0.384**	**0.530**	**0.401**
Adair	1.875	0.591	0.152	0.328	0.322	0.396
Alfalfa	1.816	0.676	0.257	0.188	0.736	0.303
Atoka	1.979	0.621	0.252	0.377	0.416	0.400
Beaver	2.239	0.652	0.347	0.353	0.597	0.438
Beckham	4.391	0.613	0.180	0.437	0.674	0.326
Blaine	1.940	0.677	0.361	0.277	0.659	0.407
Bryan	4.140	0.583	0.192	0.464	0.495	0.469
Caddo	3.878	0.753	0.268	0.489	0.519	0.428
Canadian	1.841	0.623	0.497	0.511	0.577	0.395
Carter	3.017	0.649	0.250	0.423	0.559	0.380
Cherokee	3.339	0.577	0.189	0.423	0.390	0.489
Choctaw	5.920	0.645	0.135	0.417	0.439	0.516
Cimarron	2.640	0.710	0.269	0.273	0.595	0.450

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Cleveland	0.770	0.715	0.889	0.388	0.493	0.389
Coal	1.218	0.735	0.318	0.226	0.443	0.428
Comanche	2.584	0.666	0.312	0.538	0.462	0.354
Cotton	1.860	0.683	0.188	0.271	0.422	0.391
Craig	6.090	0.607	0.150	0.369	0.619	0.529
Creek	3.071	0.717	0.273	0.473	0.502	0.375
Custer	4.251	0.575	0.212	0.449	0.691	0.412
Delaware	2.099	0.562	0.257	0.459	0.407	0.381
Dewey	3.116	0.733	0.269	0.429	0.569	0.358
Ellis	2.967	0.728	0.288	0.346	0.634	0.409
Garfield	4.687	0.581	0.161	0.469	0.557	0.389
Garvin	3.309	0.623	0.168	0.408	0.490	0.342
Grady	3.236	0.641	0.247	0.464	0.578	0.357
Grant	2.516	0.701	0.302	0.320	0.693	0.353
Greer	1.710	0.599	0.199	0.169	0.606	0.378
Harmon	-0.986	0.614	0.256	0.077	0.325	0.303
Harper	2.964	0.657	0.287	0.341	0.696	0.415
Haskell	3.131	0.715	0.168	0.312	0.466	0.401
Hughes	1.638	0.601	0.200	0.288	0.474	0.344
Jackson	1.678	0.633	0.346	0.380	0.472	0.398
Jefferson	1.920	0.695	0.209	0.216	0.486	0.426
Johnston	2.151	0.685	0.221	0.331	0.383	0.430
Kay	5.864	0.761	0.179	0.437	0.555	0.458
Kingfisher	4.885	0.749	0.201	0.359	0.706	0.393
Kiowa	2.918	0.680	0.279	0.320	0.711	0.386
Latimer	2.248	0.532	0.191	0.319	0.470	0.420
Le Flore	2.851	0.436	0.236	0.548	0.393	0.533
Lincoln	4.431	0.745	0.206	0.402	0.632	0.372
Logan	3.181	0.675	0.210	0.392	0.511	0.384
Love	1.989	0.614	0.236	0.294	0.502	0.405
Major	2.479	0.627	0.206	0.288	0.665	0.302
Marshall	1.521	0.568	0.237	0.309	0.415	0.405
Mayes	4.002	0.584	0.180	0.495	0.487	0.389
McClain	3.727	0.686	0.240	0.433	0.639	0.363
McCurtain	3.334	0.487	0.157	0.478	0.345	0.458
McIntosh	3.487	0.638	0.171	0.376	0.439	0.434
Murray	4.068	0.641	0.153	0.331	0.598	0.373
Muskogee	4.355	0.572	0.201	0.497	0.529	0.474
Noble	4.963	0.682	0.161	0.366	0.580	0.432
Nowata	3.127	0.751	0.191	0.260	0.553	0.413
Okfuskee	2.791	0.712	0.145	0.298	0.428	0.379

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Oklahoma	0.868	0.564	0.783	0.575	0.522	0.264
Okmulgee	4.724	0.642	0.134	0.368	0.513	0.406
Osage	7.378	0.683	0.177	0.503	0.501	0.644
Ottawa	3.231	0.734	0.237	0.416	0.411	0.459
Pawnee	5.848	0.740	0.126	0.346	0.516	0.431
Payne	2.937	0.649	0.293	0.482	0.489	0.439
Pittsburg	4.262	0.590	0.193	0.522	0.556	0.369
Pontotoc	4.237	0.564	0.168	0.432	0.596	0.383
Pottawatomie	3.184	0.688	0.194	0.392	0.489	0.364
Pushmataha	4.008	0.654	0.139	0.389	0.412	0.410
Roger Mills	2.428	0.755	0.300	0.354	0.649	0.303
Rogers	4.186	0.749	0.291	0.501	0.545	0.496
Seminole	2.142	0.672	0.180	0.272	0.511	0.344
Sequoyah	3.207	0.499	0.156	0.439	0.414	0.414
Stephens	3.337	0.615	0.157	0.376	0.521	0.336
Texas	4.574	0.623	0.205	0.483	0.554	0.459
Tillman	2.456	0.662	0.171	0.257	0.476	0.412
Tulsa	1.117	0.679	0.832	0.628	0.486	0.301
Wagoner	3.678	0.646	0.235	0.498	0.466	0.445
Washington	2.702	0.694	0.223	0.320	0.561	0.371
Washita	3.242	0.659	0.239	0.331	0.699	0.375
Woods	3.845	0.667	0.173	0.347	0.625	0.342
Woodward	6.006	0.598	0.147	0.484	0.672	0.351
Texas	**2.835**	**0.577**	**0.223**	**0.377**	**0.459**	**0.403**
Anderson	4.889	0.557	0.138	0.475	0.412	0.461
Andrews	2.048	0.486	0.108	0.339	0.349	0.352
Angelina	3.534	0.515	0.195	0.516	0.448	0.441
Aransas	3.070	0.573	0.180	0.334	0.404	0.522
Archer	5.967	0.603	0.123	0.431	0.603	0.361
Armstrong	0.550	0.570	0.330	0.203	0.462	0.354
Atascosa	6.983	0.587	0.091	0.451	0.410	0.436
Austin	5.903	0.594	0.111	0.420	0.535	0.379
Bailey	0.779	0.538	0.236	0.241	0.405	0.367
Bandera	6.551	0.565	0.085	0.373	0.529	0.387
Bastrop	1.739	0.493	0.291	0.524	0.465	0.293
Baylor	0.635	0.404	0.135	0.134	0.440	0.403
Bee	7.086	0.773	0.102	0.351	0.413	0.484
Bell	1.036	0.281	0.496	0.680	0.447	0.463
Bexar	1.156	0.261	0.530	0.884	0.521	0.391
Blanco	1.374	0.238	0.237	0.351	0.691	0.438

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Borden	0.417	0.665	0.139	0.133	0.386	0.396
Bosque	6.477	0.586	0.114	0.423	0.554	0.424
Bowie	2.191	0.488	0.312	0.519	0.458	0.454
Brazoria	2.694	0.662	0.602	0.776	0.524	0.549
Brazos	1.739	0.497	0.323	0.531	0.426	0.357
Brewster	5.862	0.642	0.151	0.360	0.590	0.511
Briscoe	2.225	0.678	0.237	0.289	0.529	0.394
Brooks	-0.129	0.557	0.270	0.228	0.165	0.408
Brown	3.701	0.535	0.159	0.414	0.578	0.350
Burleson	4.754	0.647	0.128	0.337	0.511	0.420
Burnet	4.301	0.585	0.203	0.431	0.596	0.477
Caldwell	2.825	0.465	0.138	0.403	0.509	0.312
Calhoun	2.808	0.505	0.217	0.435	0.429	0.490
Callahan	3.683	0.564	0.159	0.384	0.537	0.389
Cameron	4.001	0.575	0.334	0.702	0.384	0.690
Camp	1.030	0.623	0.278	0.244	0.467	0.362
Carson	2.129	0.762	0.468	0.380	0.635	0.426
Cass	2.324	0.565	0.206	0.380	0.402	0.425
Castro	1.560	0.558	0.203	0.233	0.324	0.533
Chambers	1.567	0.615	0.571	0.511	0.440	0.500
Cherokee	4.782	0.528	0.133	0.506	0.393	0.441
Childress	0.866	0.375	0.198	0.239	0.481	0.356
Clay	8.308	0.662	0.108	0.413	0.674	0.380
Cochran	-0.606	0.487	0.247	0.030	0.396	0.339
Coke	0.272	0.594	0.102	0.270	0.228	0.357
Coleman	2.797	0.700	0.133	0.229	0.501	0.380
Collin	2.168	0.699	0.549	0.678	0.527	0.351
Collingsworth	1.058	0.629	0.250	0.168	0.644	0.288
Colorado	6.818	0.589	0.095	0.379	0.559	0.403
Comal	0.981	0.290	0.380	0.505	0.595	0.313
Comanche	4.608	0.679	0.115	0.338	0.433	0.417
Concho	3.620	0.719	0.102	0.208	0.502	0.396
Cooke	4.780	0.606	0.135	0.471	0.496	0.339
Coryell	5.613	0.624	0.143	0.445	0.446	0.497
Cottle	0.341	0.688	0.315	0.228	0.387	0.320
Crane	1.158	0.563	0.143	0.159	0.435	0.413
Crockett	6.122	0.543	0.102	0.304	0.581	0.489
Crosby	2.219	0.472	0.147	0.292	0.476	0.397
Culberson	0.754	0.670	0.214	0.187	0.456	0.344
Dallam	1.140	0.658	0.299	0.258	0.509	0.338
Dallas	1.232	0.635	0.844	0.789	0.485	0.236

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Dawson	2.599	0.591	0.097	0.295	0.463	0.298
Deaf Smith	1.506	0.475	0.200	0.304	0.455	0.377
Delta	0.881	0.673	0.289	0.227	0.376	0.421
Denton	2.632	0.676	0.512	0.711	0.493	0.460
DeWitt	4.451	0.517	0.102	0.298	0.475	0.468
Dickens	0.061	0.674	0.212	0.091	0.403	0.401
Dimmit	5.251	0.466	0.080	0.328	0.475	0.443
Donley	1.274	0.730	0.345	0.315	0.527	0.295
Duval	1.758	0.548	0.108	0.327	0.275	0.380
Eastland	3.250	0.471	0.120	0.354	0.491	0.374
Ector	1.459	0.581	0.382	0.507	0.448	0.296
Edwards	0.592	0.498	0.118	0.205	0.385	0.341
El Paso	2.536	0.637	0.417	0.709	0.443	0.367
Ellis	2.991	0.711	0.446	0.716	0.538	0.371
Erath	8.733	0.698	0.116	0.452	0.558	0.469
Falls	2.417	0.523	0.155	0.326	0.405	0.426
Fannin	6.984	0.647	0.115	0.452	0.501	0.428
Fayette	6.177	0.451	0.091	0.423	0.584	0.395
Fisher	1.176	0.569	0.174	0.183	0.475	0.382
Floyd	2.534	0.596	0.238	0.212	0.552	0.553
Foard	0.790	0.464	0.096	0.249	0.308	0.364
Fort Bend	3.545	0.644	0.411	0.785	0.580	0.420
Franklin	0.984	0.718	0.231	0.271	0.393	0.334
Freestone	2.167	0.511	0.198	0.406	0.432	0.370
Frio	4.964	0.632	0.085	0.335	0.378	0.419
Gaines	2.636	0.546	0.135	0.294	0.487	0.370
Galveston	1.257	0.610	0.753	0.608	0.472	0.408
Garza	0.911	0.469	0.251	0.219	0.520	0.359
Gillespie	5.654	0.513	0.132	0.385	0.691	0.436
Glasscock	0.417	0.603	0.195	0.162	0.386	0.384
Goliad	2.783	0.540	0.126	0.277	0.409	0.452
Gonzales	5.614	0.622	0.075	0.356	0.378	0.400
Gray	-0.014	0.638	0.262	0.210	0.478	0.202
Grayson	5.524	0.615	0.180	0.685	0.512	0.320
Gregg	0.785	0.564	0.613	0.396	0.561	0.283
Grimes	1.601	0.529	0.237	0.372	0.468	0.328
Guadalupe	2.822	0.578	0.253	0.557	0.476	0.331
Hale	3.020	0.631	0.252	0.317	0.496	0.563
Hall	0.691	0.559	0.235	0.126	0.484	0.408
Hamilton	3.915	0.599	0.131	0.311	0.484	0.439
Hansford	1.306	0.649	0.262	0.340	0.450	0.299

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Hardeman	1.224	0.390	0.108	0.235	0.453	0.335
Hardin	1.725	0.594	0.357	0.365	0.546	0.403
Harris	1.345	0.611	0.758	0.837	0.491	0.192
Harrison	2.173	0.605	0.356	0.523	0.432	0.422
Hartley	1.316	0.722	0.233	0.319	0.440	0.289
Haskell	3.094	0.513	0.119	0.214	0.492	0.482
Hays	0.943	0.301	0.454	0.587	0.557	0.310
Hemphill	0.609	0.575	0.393	0.251	0.489	0.320
Henderson	5.915	0.606	0.141	0.536	0.439	0.441
Hidalgo	2.938	0.548	0.485	0.731	0.390	0.767
Hill	4.291	0.477	0.136	0.470	0.459	0.436
Hockley	3.576	0.684	0.178	0.387	0.519	0.357
Hood	2.698	0.588	0.280	0.469	0.535	0.399
Hopkins	6.848	0.630	0.104	0.425	0.559	0.367
Houston	2.119	0.595	0.273	0.407	0.394	0.453
Howard	4.099	0.598	0.146	0.322	0.465	0.502
Hudspeth	3.255	0.617	0.080	0.316	0.256	0.438
Hunt	2.584	0.568	0.243	0.576	0.384	0.331
Hutchinson	1.115	0.629	0.264	0.318	0.486	0.271
Irion	1.992	0.712	0.240	0.245	0.433	0.475
Jack	2.441	0.672	0.132	0.297	0.423	0.348
Jackson	5.510	0.586	0.121	0.337	0.538	0.481
Jasper	1.900	0.586	0.371	0.431	0.463	0.465
Jeff Davis	1.305	0.386	0.143	0.292	0.318	0.439
Jefferson	2.005	0.534	0.530	0.698	0.521	0.449
Jim Hogg	1.029	0.606	0.262	0.219	0.470	0.381
Jim Wells	3.181	0.572	0.109	0.328	0.392	0.391
Johnson	2.782	0.600	0.359	0.595	0.515	0.434
Jones	4.895	0.645	0.116	0.266	0.520	0.468
Karnes	3.957	0.618	0.098	0.320	0.406	0.398
Kaufman	2.182	0.688	0.446	0.547	0.506	0.392
Kendall	4.833	0.456	0.144	0.432	0.678	0.423
Kenedy	2.512	0.656	0.117	0.304	0.273	0.447
Kent	0.166	0.709	0.308	0.214	0.270	0.395
Kerr	6.409	0.450	0.098	0.487	0.550	0.412
Kimble	4.393	0.496	0.134	0.208	0.747	0.474
King	0.943	0.861	0.324	0.215	0.452	0.363
Kinney	1.693	0.542	0.097	0.315	0.225	0.416
Kleberg	3.410	0.600	0.124	0.314	0.379	0.458
Knox	4.216	0.647	0.129	0.338	0.490	0.398
La Salle	-0.964	0.629	0.090	0.176	0.292	0.333

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Lamar	4.756	0.589	0.169	0.481	0.511	0.439
Lamb	2.592	0.681	0.157	0.246	0.480	0.406
Lampasas	4.618	0.573	0.111	0.336	0.526	0.393
Lavaca	6.844	0.568	0.098	0.357	0.618	0.414
Lee	4.309	0.600	0.101	0.337	0.519	0.328
Leon	4.069	0.625	0.146	0.434	0.457	0.363
Liberty	2.381	0.568	0.316	0.508	0.467	0.428
Limestone	3.567	0.637	0.176	0.398	0.468	0.408
Lipscomb	1.241	0.774	0.334	0.332	0.375	0.371
Live Oak	7.268	0.560	0.094	0.384	0.547	0.458
Llano	5.349	0.576	0.101	0.381	0.482	0.396
Loving	1.779	0.787	0.092	0.223	0.308	0.411
Lubbock	1.818	0.545	0.492	0.599	0.495	0.437
Lynn	3.234	0.711	0.207	0.340	0.448	0.469
Madison	1.661	0.645	0.148	0.243	0.442	0.352
Marion	0.781	0.431	0.249	0.256	0.341	0.447
Martin	1.494	0.543	0.157	0.227	0.528	0.321
Mason	3.040	0.394	0.130	0.323	0.592	0.400
Matagorda	2.677	0.545	0.256	0.440	0.431	0.503
Maverick	3.521	0.677	0.143	0.446	0.269	0.419
McCulloch	3.778	0.558	0.098	0.275	0.414	0.456
McLennan	3.588	0.539	0.326	0.691	0.534	0.521
McMullen	-0.695	0.624	0.110	0.213	0.233	0.347
Medina	4.297	0.423	0.121	0.490	0.491	0.388
Menard	1.540	0.523	0.191	0.209	0.528	0.394
Midland	1.660	0.623	0.314	0.461	0.443	0.299
Milam	3.343	0.505	0.128	0.400	0.458	0.357
Mills	2.185	0.506	0.178	0.323	0.456	0.412
Mitchell	2.219	0.558	0.134	0.257	0.439	0.400
Montague	2.572	0.575	0.142	0.320	0.422	0.388
Montgomery	1.539	0.614	0.590	0.644	0.496	0.320
Moore	1.442	0.584	0.357	0.423	0.423	0.376
Morris	0.852	0.627	0.271	0.231	0.446	0.357
Motley	0.398	0.547	0.245	0.187	0.412	0.354
Nacogdoches	3.253	0.519	0.157	0.425	0.413	0.424
Navarro	2.113	0.636	0.324	0.498	0.434	0.364
Newton	0.860	0.556	0.272	0.262	0.357	0.415
Nolan	2.486	0.458	0.152	0.407	0.455	0.344
Nueces	2.518	0.639	0.465	0.699	0.477	0.419
Ochiltree	1.168	0.623	0.289	0.283	0.451	0.367
Oldham	0.684	0.860	0.328	0.278	0.382	0.313

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Orange	0.848	0.501	0.624	0.446	0.458	0.394
Palo Pinto	3.404	0.611	0.171	0.455	0.411	0.378
Panola	2.427	0.512	0.186	0.395	0.378	0.443
Parker	4.123	0.647	0.253	0.630	0.528	0.366
Parmer	3.377	0.651	0.174	0.342	0.412	0.480
Pecos	4.720	0.590	0.157	0.502	0.512	0.372
Polk	1.733	0.558	0.336	0.481	0.322	0.459
Potter	1.500	0.471	0.477	0.482	0.607	0.424
Presidio	4.401	0.596	0.098	0.343	0.337	0.466
Rains	3.426	0.610	0.139	0.355	0.530	0.322
Randall	1.625	0.593	0.474	0.408	0.594	0.425
Reagan	1.490	0.559	0.188	0.196	0.525	0.385
Real	2.888	0.609	0.086	0.199	0.407	0.439
Red River	1.089	0.639	0.262	0.298	0.359	0.385
Reeves	2.043	0.605	0.110	0.292	0.425	0.308
Refugio	3.961	0.631	0.116	0.266	0.443	0.468
Roberts	0.382	0.689	0.349	0.187	0.470	0.314
Robertson	2.598	0.600	0.173	0.355	0.405	0.410
Rockwall	1.656	0.706	0.476	0.333	0.609	0.420
Runnels	2.629	0.684	0.231	0.220	0.546	0.500
Rusk	2.966	0.586	0.209	0.507	0.407	0.368
Sabine	2.456	0.464	0.127	0.327	0.305	0.490
San Augustine	1.390	0.421	0.132	0.205	0.344	0.494
San Jacinto	1.294	0.542	0.263	0.275	0.347	0.493
San Patricio	3.860	0.615	0.189	0.489	0.402	0.444
San Saba	2.593	0.626	0.161	0.188	0.625	0.382
Schleicher	2.540	0.458	0.113	0.229	0.497	0.423
Scurry	2.706	0.674	0.149	0.324	0.413	0.375
Shackelford	1.336	0.718	0.247	0.292	0.336	0.415
Shelby	1.991	0.565	0.144	0.340	0.287	0.422
Sherman	0.740	0.625	0.244	0.239	0.444	0.317
Smith	2.703	0.590	0.366	0.630	0.532	0.387
Somervell	2.255	0.370	0.175	0.341	0.529	0.455
Starr	4.902	0.581	0.174	0.473	0.193	0.745
Stephens	0.471	0.447	0.262	0.188	0.465	0.351
Sterling	3.273	0.683	0.170	0.244	0.611	0.392
Stonewall	0.292	0.490	0.291	0.048	0.554	0.389
Sutton	1.267	0.400	0.230	0.225	0.591	0.393
Swisher	2.365	0.637	0.208	0.251	0.382	0.550
Tarrant	1.406	0.633	0.683	0.717	0.497	0.255
Taylor	2.963	0.633	0.312	0.559	0.511	0.394

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Terrell	-0.068	0.786	0.169	0.245	0.207	0.376
Terry	2.306	0.630	0.114	0.305	0.377	0.351
Throckmorton	2.527	0.531	0.109	0.194	0.442	0.461
Titus	3.436	0.558	0.152	0.454	0.413	0.371
Tom Green	4.164	0.389	0.156	0.530	0.556	0.473
Travis	0.856	0.207	0.489	0.844	0.514	0.308
Trinity	2.014	0.626	0.201	0.310	0.381	0.436
Tyler	1.388	0.563	0.276	0.371	0.370	0.392
Upshur	3.405	0.515	0.151	0.406	0.510	0.369
Upton	4.293	0.531	0.107	0.292	0.448	0.492
Uvalde	9.970	0.611	0.067	0.378	0.484	0.460
Val Verde	7.901	0.617	0.082	0.485	0.424	0.375
Van Zandt	6.769	0.634	0.099	0.444	0.492	0.369
Victoria	6.348	0.533	0.141	0.512	0.541	0.510
Walker	2.458	0.548	0.223	0.422	0.463	0.391
Waller	1.823	0.555	0.311	0.417	0.508	0.371
Ward	2.833	0.522	0.099	0.351	0.396	0.334
Washington	2.064	0.386	0.225	0.356	0.541	0.484
Webb	8.063	0.626	0.133	0.725	0.399	0.404
Wharton	8.445	0.518	0.079	0.453	0.505	0.444
Wheeler	0.566	0.631	0.322	0.253	0.436	0.309
Wichita	2.513	0.560	0.260	0.504	0.485	0.354
Wilbarger	4.432	0.654	0.098	0.255	0.472	0.430
Willacy	3.530	0.560	0.163	0.285	0.257	0.718
Williamson	1.566	0.270	0.368	0.725	0.558	0.451
Wilson	10.829	0.689	0.081	0.474	0.551	0.380
Winkler	-0.490	0.527	0.062	0.189	0.352	0.303
Wise	7.711	0.659	0.136	0.609	0.459	0.432
Wood	3.787	0.672	0.152	0.396	0.528	0.310
Yoakum	1.288	0.527	0.154	0.248	0.407	0.372
Young	4.115	0.630	0.133	0.381	0.527	0.333
Zapata	2.299	0.609	0.154	0.384	0.265	0.422
Zavala	0.176	0.477	0.110	0.255	0.191	0.401

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 7	**4.469**	**0.683**	**0.209**	**0.358**	**0.609**	**0.380**

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Iowa	**5.263**	**0.704**	**0.210**	**0.382**	**0.653**	**0.419**
Adair	5.225	0.786	0.229	0.421	0.690	0.423
Adams	1.628	0.790	0.303	0.206	0.647	0.327
Allamakee	6.770	0.711	0.131	0.369	0.678	0.378
Appanoose	3.713	0.686	0.164	0.306	0.562	0.395
Audubon	4.278	0.735	0.202	0.255	0.788	0.387
Benton	7.419	0.721	0.158	0.481	0.700	0.393
Black Hawk	2.088	0.708	0.486	0.527	0.561	0.376
Boone	4.680	0.645	0.171	0.364	0.636	0.414
Bremer	9.923	0.735	0.149	0.434	0.792	0.526
Buchanan	5.753	0.679	0.185	0.437	0.675	0.435
Buena Vista	7.584	0.752	0.147	0.425	0.614	0.465
Butler	6.096	0.721	0.202	0.398	0.736	0.488
Calhoun	3.035	0.726	0.271	0.324	0.666	0.392
Carroll	6.262	0.686	0.170	0.439	0.800	0.331
Cass	6.089	0.657	0.191	0.384	0.843	0.445
Cedar	8.664	0.717	0.146	0.441	0.677	0.511
Cerro Gordo	4.168	0.653	0.217	0.423	0.618	0.424
Cherokee	9.518	0.678	0.101	0.319	0.830	0.380
Chickasaw	13.918	0.717	0.092	0.376	0.777	0.513
Clarke	3.006	0.596	0.177	0.297	0.547	0.418
Clay	6.025	0.635	0.188	0.379	0.801	0.487
Clayton	11.687	0.718	0.113	0.477	0.781	0.417
Clinton	4.947	0.743	0.217	0.439	0.565	0.473
Crawford	5.054	0.663	0.146	0.418	0.607	0.327
Dallas	3.339	0.766	0.399	0.532	0.586	0.477
Davis	2.076	0.697	0.201	0.290	0.460	0.375
Decatur	2.984	0.724	0.182	0.291	0.509	0.396
Delaware	3.677	0.687	0.297	0.430	0.771	0.378
Des Moines	3.001	0.705	0.282	0.336	0.561	0.489
Dickinson	6.185	0.654	0.186	0.431	0.721	0.485
Dubuque	3.285	0.671	0.322	0.494	0.684	0.372
Emmet	5.979	0.673	0.151	0.302	0.688	0.483
Fayette	11.248	0.685	0.096	0.362	0.730	0.479
Floyd	6.656	0.693	0.132	0.385	0.635	0.405
Franklin	3.991	0.712	0.198	0.312	0.641	0.415
Fremont	3.682	0.775	0.258	0.253	0.728	0.456
Greene	5.692	0.723	0.170	0.353	0.739	0.386
Grundy	8.028	0.764	0.156	0.379	0.732	0.486
Guthrie	4.664	0.707	0.189	0.390	0.625	0.397
Hamilton	3.703	0.663	0.173	0.390	0.578	0.322

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Hancock	7.334	0.724	0.131	0.321	0.674	0.468
Hardin	5.135	0.675	0.188	0.403	0.683	0.413
Harrison	3.509	0.790	0.263	0.332	0.677	0.387
Henry	7.179	0.760	0.156	0.395	0.599	0.504
Howard	8.467	0.720	0.115	0.312	0.673	0.486
Humboldt	3.489	0.683	0.153	0.328	0.542	0.343
Ida	8.366	0.736	0.105	0.287	0.748	0.389
Iowa	5.631	0.706	0.188	0.417	0.675	0.430
Jackson	3.958	0.698	0.233	0.428	0.614	0.396
Jasper	3.825	0.666	0.200	0.424	0.565	0.369
Jefferson	3.401	0.658	0.189	0.271	0.630	0.413
Johnson	3.598	0.681	0.332	0.550	0.548	0.493
Jones	4.844	0.705	0.204	0.366	0.719	0.412
Keokuk	5.122	0.723	0.167	0.340	0.600	0.446
Kossuth	8.941	0.712	0.142	0.459	0.745	0.447
Lee	3.816	0.662	0.256	0.401	0.624	0.481
Linn	1.863	0.692	0.750	0.681	0.623	0.398
Louisa	4.685	0.721	0.190	0.322	0.570	0.511
Lucas	2.074	0.696	0.177	0.258	0.472	0.371
Lyon	7.903	0.731	0.131	0.364	0.740	0.403
Madison	5.130	0.731	0.205	0.375	0.694	0.438
Mahaska	5.443	0.712	0.170	0.337	0.630	0.472
Marion	4.977	0.606	0.185	0.428	0.706	0.404
Marshall	4.005	0.690	0.181	0.417	0.532	0.364
Mills	4.233	0.758	0.230	0.401	0.649	0.382
Mitchell	8.104	0.728	0.140	0.355	0.735	0.475
Monona	4.388	0.694	0.157	0.305	0.583	0.422
Monroe	2.814	0.684	0.222	0.284	0.629	0.373
Montgomery	2.717	0.584	0.172	0.215	0.646	0.390
Muscatine	3.346	0.650	0.243	0.365	0.546	0.490
O'Brien	8.334	0.663	0.123	0.380	0.712	0.463
Osceola	4.570	0.682	0.236	0.390	0.716	0.462
Page	5.157	0.622	0.128	0.292	0.634	0.422
Palo Alto	6.431	0.744	0.158	0.375	0.697	0.406
Plymouth	9.143	0.715	0.114	0.467	0.722	0.323
Pocahontas	3.096	0.723	0.313	0.302	0.690	0.479
Polk	1.733	0.657	0.746	0.715	0.581	0.375
Pottawattamie	3.993	0.725	0.246	0.530	0.540	0.359
Poweshiek	5.775	0.678	0.177	0.436	0.702	0.391
Ringgold	1.737	0.717	0.360	0.228	0.664	0.390
Sac	3.558	0.759	0.262	0.335	0.697	0.393

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Scott	1.745	0.627	0.477	0.472	0.567	0.389
Shelby	9.977	0.727	0.108	0.368	0.784	0.391
Sioux	6.450	0.675	0.194	0.484	0.831	0.378
Story	3.478	0.708	0.311	0.587	0.530	0.376
Tama	4.247	0.738	0.177	0.369	0.523	0.409
Taylor	1.137	0.741	0.292	0.174	0.539	0.376
Union	3.125	0.640	0.221	0.289	0.705	0.375
Van Buren	4.164	0.798	0.172	0.340	0.461	0.442
Wapello	1.991	0.642	0.265	0.347	0.498	0.374
Warren	4.842	0.645	0.200	0.435	0.620	0.458
Washington	10.068	0.768	0.131	0.420	0.740	0.464
Wayne	1.801	0.717	0.261	0.256	0.522	0.386
Webster	4.654	0.718	0.203	0.423	0.620	0.396
Winnebago	7.573	0.744	0.145	0.331	0.767	0.442
Winneshiek	11.567	0.670	0.093	0.403	0.776	0.410
Woodbury	4.907	0.770	0.232	0.563	0.579	0.342
Worth	5.903	0.780	0.157	0.339	0.573	0.471
Wright	5.833	0.730	0.143	0.325	0.639	0.416
Kansas	**4.594**	**0.698**	**0.195**	**0.332**	**0.651**	**0.369**
Allen	6.363	0.670	0.126	0.355	0.614	0.425
Anderson	8.097	0.718	0.125	0.298	0.802	0.425
Atchison	5.877	0.600	0.106	0.328	0.584	0.412
Barber	3.689	0.689	0.137	0.258	0.656	0.308
Barton	2.752	0.690	0.334	0.425	0.684	0.347
Bourbon	4.195	0.699	0.185	0.275	0.647	0.451
Brown	10.405	0.850	0.130	0.338	0.742	0.502
Butler	5.826	0.651	0.214	0.611	0.639	0.419
Chase	2.427	0.762	0.226	0.273	0.506	0.406
Chautauqua	2.762	0.754	0.155	0.150	0.685	0.335
Cherokee	3.056	0.558	0.222	0.368	0.568	0.455
Cheyenne	4.606	0.851	0.163	0.296	0.627	0.349
Clark	2.315	0.669	0.200	0.306	0.555	0.319
Clay	7.463	0.637	0.102	0.276	0.748	0.400
Cloud	6.558	0.680	0.107	0.305	0.751	0.304
Coffey	9.115	0.817	0.134	0.405	0.777	0.363
Comanche	3.907	0.775	0.137	0.245	0.541	0.397
Cowley	3.245	0.631	0.182	0.427	0.500	0.333
Crawford	4.833	0.592	0.174	0.468	0.554	0.441
Decatur	4.265	0.669	0.141	0.222	0.704	0.377
Dickinson	7.469	0.670	0.132	0.397	0.721	0.406

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Doniphan	9.177	0.811	0.103	0.332	0.610	0.438
Douglas	3.609	0.600	0.254	0.514	0.545	0.443
Edwards	1.797	0.681	0.211	0.152	0.633	0.369
Elk	1.464	0.787	0.213	0.275	0.421	0.340
Ellis	3.994	0.568	0.181	0.422	0.734	0.288
Ellsworth	6.656	0.750	0.154	0.335	0.744	0.411
Finney	4.658	0.653	0.154	0.429	0.632	0.290
Ford	5.126	0.710	0.186	0.429	0.569	0.440
Franklin	6.232	0.629	0.129	0.393	0.634	0.402
Geary	3.437	0.756	0.197	0.365	0.470	0.407
Gove	4.817	0.756	0.181	0.325	0.812	0.282
Graham	2.483	0.707	0.245	0.196	0.704	0.389
Grant	1.936	0.826	0.254	0.242	0.597	0.316
Gray	3.893	0.731	0.203	0.382	0.680	0.297
Greeley	0.625	0.704	0.139	0.213	0.418	0.299
Greenwood	3.665	0.738	0.141	0.233	0.639	0.336
Hamilton	2.314	0.670	0.104	0.240	0.405	0.375
Harper	2.518	0.723	0.234	0.278	0.591	0.371
Harvey	5.831	0.632	0.157	0.413	0.666	0.422
Haskell	3.616	0.830	0.201	0.260	0.612	0.400
Hodgeman	1.327	0.654	0.282	0.266	0.517	0.345
Jackson	7.410	0.719	0.142	0.391	0.760	0.377
Jefferson	8.296	0.691	0.131	0.440	0.670	0.441
Jewell	1.160	0.600	0.383	0.220	0.680	0.332
Johnson	1.354	0.675	0.670	0.528	0.589	0.317
Kearny	5.831	0.844	0.171	0.283	0.726	0.409
Kingman	5.428	0.733	0.164	0.317	0.712	0.396
Kiowa	2.508	0.646	0.293	0.330	0.748	0.320
Labette	2.702	0.636	0.283	0.361	0.572	0.454
Lane	2.441	0.794	0.187	0.237	0.563	0.341
Leavenworth	3.229	0.698	0.269	0.437	0.575	0.387
Lincoln	4.708	0.678	0.105	0.216	0.716	0.305
Linn	6.039	0.704	0.194	0.425	0.660	0.504
Logan	5.799	0.662	0.124	0.239	0.868	0.302
Lyon	6.409	0.658	0.135	0.449	0.543	0.428
Marion	8.371	0.743	0.126	0.333	0.731	0.447
Marshall	12.238	0.758	0.082	0.330	0.819	0.342
McPherson	6.926	0.621	0.162	0.488	0.771	0.402
Meade	3.233	0.698	0.281	0.341	0.750	0.375
Miami	10.175	0.696	0.120	0.493	0.733	0.406
Mitchell	3.272	0.696	0.225	0.304	0.718	0.340

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Montgomery	4.483	0.645	0.177	0.419	0.526	0.438
Morris	5.363	0.697	0.153	0.304	0.715	0.390
Morton	1.778	0.617	0.172	0.249	0.434	0.398
Nemaha	9.777	0.681	0.113	0.380	0.859	0.377
Neosho	6.130	0.601	0.140	0.383	0.676	0.439
Ness	2.860	0.726	0.188	0.230	0.558	0.420
Norton	2.500	0.686	0.259	0.271	0.728	0.323
Osage	6.423	0.709	0.134	0.410	0.580	0.400
Osborne	2.731	0.759	0.216	0.215	0.688	0.346
Ottawa	11.483	0.787	0.101	0.324	0.838	0.394
Pawnee	2.831	0.522	0.161	0.244	0.690	0.354
Phillips	3.888	0.743	0.226	0.302	0.787	0.337
Pottawatomie	9.454	0.730	0.124	0.478	0.739	0.358
Pratt	2.532	0.742	0.314	0.311	0.719	0.338
Rawlins	2.903	0.678	0.129	0.211	0.672	0.273
Reno	4.696	0.770	0.246	0.466	0.679	0.375
Republic	3.982	0.754	0.182	0.290	0.705	0.327
Rice	4.229	0.730	0.168	0.326	0.585	0.388
Riley	3.611	0.683	0.225	0.437	0.508	0.417
Rooks	3.003	0.704	0.232	0.283	0.705	0.346
Rush	3.069	0.584	0.204	0.351	0.679	0.325
Russell	3.278	0.674	0.136	0.272	0.564	0.337
Saline	7.297	0.766	0.172	0.449	0.670	0.458
Scott	4.089	0.572	0.144	0.269	0.761	0.332
Sedgwick	1.459	0.604	0.795	0.714	0.559	0.372
Seward	1.377	0.522	0.241	0.373	0.509	0.262
Shawnee	2.335	0.628	0.358	0.447	0.610	0.382
Sheridan	2.996	0.740	0.188	0.274	0.710	0.259
Sherman	4.047	0.734	0.178	0.277	0.720	0.336
Smith	2.155	0.718	0.257	0.221	0.689	0.337
Stafford	1.674	0.716	0.205	0.227	0.604	0.279
Stanton	3.661	0.664	0.097	0.253	0.500	0.358
Stevens	2.249	0.677	0.106	0.268	0.498	0.267
Sumner	5.097	0.647	0.193	0.467	0.650	0.404
Thomas	5.368	0.651	0.166	0.389	0.760	0.342
Trego	2.723	0.689	0.289	0.257	0.791	0.367
Wabaunsee	12.348	0.809	0.107	0.418	0.828	0.361
Wallace	1.208	0.687	0.175	0.224	0.519	0.282
Washington	9.922	0.708	0.096	0.310	0.805	0.379
Wichita	7.151	0.856	0.092	0.230	0.664	0.344
Wilson	6.477	0.719	0.135	0.283	0.735	0.414

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Woodson	1.478	0.830	0.214	0.135	0.581	0.358
Wyandotte	0.320	0.654	0.653	0.294	0.454	0.262
Missouri	**4.396**	**0.626**	**0.206**	**0.399**	**0.530**	**0.389**
Adair	6.492	0.622	0.113	0.404	0.488	0.466
Andrew	7.454	0.739	0.116	0.379	0.551	0.435
Atchison	7.979	0.706	0.089	0.326	0.585	0.401
Audrain	8.086	0.592	0.108	0.456	0.623	0.422
Barry	2.697	0.508	0.208	0.466	0.489	0.366
Barton	2.694	0.648	0.246	0.350	0.545	0.414
Bates	5.285	0.703	0.161	0.407	0.478	0.483
Benton	4.953	0.519	0.147	0.440	0.517	0.494
Bollinger	2.108	0.612	0.179	0.327	0.467	0.336
Boone	2.924	0.691	0.360	0.596	0.501	0.387
Buchanan	3.561	0.673	0.199	0.362	0.530	0.426
Butler	2.165	0.460	0.248	0.441	0.511	0.401
Caldwell	9.203	0.724	0.081	0.333	0.554	0.428
Callaway	7.770	0.720	0.137	0.574	0.552	0.351
Camden	3.593	0.587	0.206	0.533	0.584	0.282
Cape Girardeau	2.423	0.504	0.338	0.540	0.664	0.358
Carroll	6.187	0.699	0.104	0.333	0.579	0.365
Carter	1.103	0.523	0.379	0.329	0.367	0.489
Cass	3.888	0.710	0.297	0.600	0.598	0.348
Cedar	2.637	0.648	0.296	0.306	0.629	0.469
Chariton	6.389	0.692	0.105	0.329	0.571	0.395
Christian	2.468	0.590	0.339	0.483	0.609	0.381
Clark	2.241	0.802	0.178	0.287	0.341	0.432
Clay	1.049	0.634	0.752	0.490	0.543	0.355
Clinton	9.805	0.773	0.104	0.387	0.649	0.412
Cole	3.431	0.545	0.249	0.483	0.694	0.373
Cooper	6.827	0.615	0.107	0.395	0.583	0.403
Crawford	5.373	0.599	0.136	0.395	0.589	0.409
Dade	2.087	0.605	0.151	0.240	0.427	0.424
Dallas	2.552	0.553	0.159	0.357	0.447	0.368
Daviess	6.875	0.799	0.119	0.343	0.540	0.425
DeKalb	7.420	0.719	0.108	0.381	0.496	0.458
Dent	6.137	0.666	0.103	0.293	0.575	0.422
Douglas	2.476	0.583	0.154	0.323	0.377	0.427
Dunklin	2.678	0.533	0.177	0.382	0.423	0.423
Franklin	2.560	0.610	0.388	0.601	0.590	0.354

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Gasconade	4.424	0.541	0.109	0.310	0.621	0.345
Gentry	3.086	0.771	0.215	0.229	0.651	0.396
Greene	1.034	0.600	0.674	0.541	0.518	0.285
Grundy	6.222	0.669	0.111	0.297	0.663	0.382
Harrison	6.562	0.769	0.102	0.305	0.574	0.377
Henry	7.539	0.621	0.128	0.419	0.586	0.524
Hickory	3.216	0.529	0.113	0.335	0.367	0.437
Holt	8.481	0.737	0.100	0.292	0.688	0.416
Howard	5.567	0.712	0.105	0.282	0.580	0.379
Howell	4.298	0.516	0.161	0.432	0.611	0.403
Iron	1.639	0.555	0.287	0.314	0.448	0.461
Jackson	1.604	0.689	0.709	0.723	0.491	0.309
Jasper	1.313	0.605	0.658	0.614	0.460	0.362
Jefferson	1.578	0.600	0.590	0.609	0.564	0.333
Johnson	6.269	0.619	0.148	0.572	0.524	0.385
Knox	1.448	0.747	0.148	0.240	0.378	0.368
Laclede	3.111	0.626	0.170	0.410	0.474	0.333
Lafayette	9.829	0.724	0.112	0.466	0.711	0.360
Lawrence	2.496	0.549	0.259	0.406	0.591	0.380
Lewis	3.442	0.702	0.187	0.323	0.548	0.398
Lincoln	3.926	0.654	0.240	0.535	0.539	0.388
Linn	6.916	0.705	0.106	0.370	0.534	0.408
Livingston	5.838	0.624	0.104	0.319	0.636	0.357
Macon	10.470	0.707	0.112	0.466	0.666	0.450
Madison	2.432	0.581	0.198	0.330	0.492	0.399
Maries	2.430	0.503	0.134	0.357	0.467	0.317
Marion	4.559	0.597	0.152	0.395	0.578	0.396
McDonald	1.812	0.528	0.163	0.387	0.447	0.264
Mercer	2.984	0.736	0.087	0.177	0.498	0.367
Miller	5.434	0.608	0.121	0.480	0.545	0.297
Mississippi	0.858	0.624	0.329	0.310	0.347	0.384
Moniteau	7.139	0.657	0.109	0.366	0.658	0.372
Monroe	6.691	0.692	0.123	0.325	0.622	0.448
Montgomery	7.410	0.702	0.105	0.380	0.573	0.396
Morgan	5.190	0.628	0.125	0.455	0.485	0.354
New Madrid	1.324	0.553	0.325	0.418	0.393	0.362
Newton	2.345	0.589	0.318	0.526	0.542	0.326
Nodaway	10.017	0.623	0.099	0.509	0.601	0.429
Oregon	2.033	0.480	0.178	0.271	0.451	0.465
Osage	9.390	0.615	0.094	0.407	0.790	0.322
Ozark	2.437	0.462	0.187	0.332	0.570	0.399

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Pemiscot	1.461	0.595	0.235	0.310	0.396	0.397
Perry	4.027	0.644	0.191	0.333	0.752	0.338
Pettis	5.253	0.672	0.160	0.444	0.530	0.418
Phelps	5.511	0.606	0.136	0.502	0.510	0.364
Pike	5.451	0.628	0.138	0.402	0.538	0.433
Platte	2.349	0.737	0.384	0.495	0.523	0.357
Polk	4.151	0.563	0.160	0.404	0.548	0.417
Pulaski	1.882	0.567	0.293	0.481	0.388	0.378
Putnam	2.930	0.607	0.079	0.275	0.399	0.351
Ralls	6.976	0.705	0.127	0.388	0.608	0.418
Randolph	7.289	0.636	0.112	0.414	0.640	0.375
Ray	7.713	0.668	0.100	0.380	0.563	0.421
Reynolds	3.532	0.480	0.150	0.323	0.574	0.453
Ripley	2.095	0.487	0.141	0.263	0.385	0.467
Saline	5.479	0.632	0.108	0.364	0.536	0.370
Schuyler	4.128	0.751	0.071	0.282	0.391	0.353
Scotland	1.080	0.715	0.164	0.211	0.357	0.400
Scott	2.253	0.563	0.274	0.431	0.557	0.347
Shannon	3.294	0.694	0.152	0.339	0.317	0.486
Shelby	10.041	0.741	0.080	0.348	0.581	0.412
St. Charles	1.249	0.668	0.796	0.558	0.602	0.333
St. Clair	5.508	0.681	0.126	0.296	0.471	0.533
St. Francois	2.232	0.545	0.271	0.446	0.493	0.388
St. Louis	0.737	0.590	0.853	0.620	0.530	0.152
St. Louis city	-0.589	0.625	0.597	0.254	0.374	0.010
Ste. Genevieve	4.631	0.478	0.120	0.397	0.632	0.350
Stoddard	3.068	0.523	0.169	0.452	0.446	0.370
Stone	4.621	0.556	0.179	0.477	0.587	0.431
Sullivan	6.698	0.705	0.082	0.331	0.463	0.400
Taney	2.378	0.480	0.298	0.569	0.413	0.468
Texas	8.409	0.685	0.099	0.441	0.536	0.402
Vernon	9.540	0.675	0.103	0.424	0.587	0.477
Warren	3.698	0.623	0.179	0.460	0.491	0.355
Washington	4.494	0.579	0.151	0.369	0.514	0.479
Wayne	1.899	0.479	0.237	0.344	0.450	0.463
Webster	4.367	0.572	0.151	0.498	0.574	0.283
Worth	2.938	0.688	0.107	0.248	0.417	0.398
Wright	4.457	0.535	0.117	0.367	0.500	0.413
Nebraska	**3.572**	**0.714**	**0.226**	**0.311**	**0.613**	**0.340**
Adams	2.943	0.678	0.289	0.361	0.620	0.436

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Antelope	8.791	0.702	0.079	0.283	0.753	0.308
Arthur	-0.202	0.666	0.186	0.119	0.535	0.234
Banner	-3.158	0.914	0.153	0.171	0.236	0.224
Blaine	0.240	0.749	0.353	0.153	0.477	0.312
Boone	8.097	0.701	0.077	0.306	0.681	0.299
Box Butte	3.848	0.522	0.118	0.318	0.636	0.314
Boyd	0.631	0.797	0.407	0.191	0.586	0.270
Brown	2.198	0.646	0.272	0.196	0.818	0.323
Buffalo	3.869	0.662	0.282	0.510	0.736	0.344
Burt	7.826	0.725	0.082	0.252	0.659	0.376
Butler	8.718	0.752	0.124	0.355	0.723	0.435
Cass	6.888	0.674	0.130	0.498	0.588	0.342
Cedar	3.890	0.704	0.257	0.395	0.737	0.374
Chase	2.106	0.754	0.232	0.326	0.473	0.345
Cherry	2.919	0.737	0.264	0.367	0.627	0.339
Cheyenne	6.465	0.702	0.116	0.367	0.678	0.311
Clay	2.581	0.810	0.416	0.313	0.614	0.523
Colfax	6.004	0.760	0.087	0.313	0.467	0.380
Cuming	8.769	0.676	0.096	0.332	0.719	0.387
Custer	4.087	0.763	0.234	0.471	0.724	0.234
Dakota	4.885	0.796	0.137	0.352	0.446	0.416
Dawes	3.361	0.664	0.150	0.251	0.681	0.306
Dawson	3.121	0.723	0.218	0.395	0.641	0.255
Deuel	2.484	0.681	0.130	0.278	0.449	0.347
Dixon	5.098	0.771	0.124	0.336	0.531	0.359
Dodge	7.063	0.726	0.143	0.431	0.623	0.416
Douglas	0.929	0.723	0.810	0.589	0.555	0.155
Dundy	2.753	0.699	0.121	0.275	0.502	0.307
Fillmore	2.693	0.699	0.388	0.322	0.800	0.433
Franklin	0.730	0.780	0.268	0.191	0.538	0.279
Frontier	1.814	0.809	0.254	0.233	0.558	0.347
Furnas	2.925	0.794	0.319	0.394	0.640	0.353
Gage	3.087	0.711	0.264	0.392	0.689	0.303
Garden	0.845	0.718	0.294	0.234	0.521	0.285
Garfield	0.877	0.536	0.196	0.234	0.531	0.266
Gosper	1.825	0.687	0.311	0.280	0.642	0.333
Grant	0.543	0.829	0.235	0.154	0.533	0.283
Greeley	1.044	0.618	0.329	0.257	0.601	0.281
Hall	3.229	0.719	0.295	0.439	0.691	0.325
Hamilton	4.716	0.675	0.246	0.379	0.747	0.503
Harlan	1.736	0.744	0.279	0.239	0.532	0.395

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Hayes	-1.461	0.661	0.196	0.121	0.284	0.279
Hitchcock	0.529	0.805	0.185	0.241	0.400	0.282
Holt	3.921	0.732	0.274	0.388	0.889	0.278
Hooker	0.468	0.662	0.242	0.214	0.415	0.319
Howard	2.695	0.781	0.181	0.256	0.571	0.334
Jefferson	2.609	0.743	0.289	0.293	0.681	0.365
Johnson	5.632	0.735	0.116	0.298	0.673	0.312
Kearney	3.510	0.785	0.300	0.323	0.708	0.443
Keith	4.476	0.727	0.164	0.375	0.686	0.269
Keya Paha	-0.180	0.761	0.288	0.179	0.372	0.294
Kimball	0.305	0.617	0.219	0.136	0.509	0.304
Knox	4.803	0.754	0.230	0.418	0.673	0.419
Lancaster	2.165	0.654	0.594	0.636	0.631	0.419
Lincoln	4.963	0.663	0.198	0.551	0.663	0.289
Logan	0.160	0.769	0.318	0.194	0.551	0.190
Loup	-0.262	0.650	0.258	0.177	0.433	0.233
Madison	7.830	0.635	0.114	0.382	0.763	0.361
McPherson	-0.238	0.796	0.279	0.149	0.483	0.233
Merrick	4.054	0.700	0.172	0.285	0.679	0.367
Morrill	3.522	0.709	0.115	0.370	0.502	0.243
Nance	3.205	0.646	0.152	0.293	0.595	0.328
Nemaha	5.621	0.766	0.081	0.226	0.569	0.357
Nuckolls	2.071	0.651	0.213	0.199	0.630	0.370
Otoe	4.180	0.689	0.255	0.391	0.795	0.384
Pawnee	8.506	0.777	0.058	0.266	0.567	0.331
Perkins	7.398	0.778	0.128	0.330	0.763	0.340
Phelps	4.864	0.635	0.155	0.262	0.725	0.432
Pierce	18.224	0.697	0.053	0.299	0.826	0.388
Platte	6.302	0.620	0.145	0.431	0.736	0.359
Polk	3.854	0.763	0.238	0.317	0.690	0.407
Red Willow	6.064	0.691	0.104	0.313	0.677	0.305
Richardson	11.722	0.703	0.074	0.310	0.719	0.408
Rock	1.764	0.763	0.183	0.242	0.520	0.308
Saline	2.502	0.640	0.272	0.346	0.598	0.392
Sarpy	1.376	0.699	0.509	0.353	0.595	0.363
Saunders	8.828	0.753	0.140	0.453	0.708	0.423
Scotts Bluff	2.511	0.694	0.392	0.470	0.716	0.309
Seward	7.622	0.748	0.160	0.417	0.772	0.408
Sheridan	1.008	0.620	0.319	0.279	0.595	0.247

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Sherman	1.705	0.845	0.283	0.240	0.611	0.297
Sioux	-0.141	0.765	0.139	0.185	0.334	0.335
Stanton	3.498	0.593	0.192	0.370	0.651	0.352
Thayer	2.359	0.754	0.411	0.338	0.750	0.370
Thomas	1.301	0.716	0.293	0.216	0.559	0.349
Thurston	7.605	0.791	0.147	0.377	0.217	0.805
Valley	2.106	0.624	0.289	0.279	0.803	0.266
Washington	4.788	0.663	0.215	0.398	0.800	0.374
Wayne	3.875	0.659	0.175	0.329	0.590	0.403
Webster	0.645	0.671	0.286	0.207	0.498	0.302
Wheeler	-0.951	0.762	0.233	0.165	0.429	0.173
York	5.016	0.672	0.227	0.353	0.854	0.436

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 8	**6.477**	**0.685**	**0.162**	**0.398**	**0.617**	**0.395**
Colorado	**5.776**	**0.673**	**0.203**	**0.453**	**0.555**	**0.396**
Adams	1.306	0.677	0.592	0.606	0.520	0.205
Alamosa	5.334	0.600	0.121	0.389	0.601	0.347
Arapahoe	0.672	0.662	0.591	0.436	0.508	0.179
Archuleta	8.764	0.666	0.117	0.440	0.580	0.500
Baca	1.656	0.697	0.128	0.188	0.472	0.357
Bent	0.310	0.533	0.203	0.164	0.402	0.363
Boulder	2.194	0.659	0.556	0.645	0.539	0.436
Broomfield	0.246	0.720	0.702	0.227	0.524	0.246
Chaffee	12.822	0.598	0.091	0.472	0.744	0.504
Cheyenne	3.201	0.824	0.106	0.294	0.497	0.265
Clear Creek	5.586	0.693	0.202	0.499	0.619	0.438
Conejos	6.227	0.778	0.082	0.339	0.410	0.385
Costilla	-0.810	0.584	0.122	0.328	0.206	0.224
Crowley	-2.960	0.719	0.125	0.150	0.167	0.307
Custer	4.198	0.634	0.179	0.388	0.573	0.418
Delta	9.362	0.623	0.121	0.542	0.562	0.517
Denver	0.231	0.642	0.551	0.403	0.487	0.068
Dolores	5.398	0.602	0.097	0.222	0.438	0.577
Douglas	2.516	0.703	0.467	0.565	0.588	0.411
Eagle	12.194	0.663	0.124	0.627	0.650	0.543
El Paso	2.655	0.620	0.490	0.875	0.500	0.318

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Elbert	7.716	0.682	0.132	0.579	0.657	0.269
Fremont	6.408	0.712	0.155	0.498	0.527	0.418
Garfield	13.115	0.730	0.131	0.707	0.688	0.454
Gilpin	2.399	0.642	0.274	0.387	0.528	0.388
Grand	10.719	0.678	0.139	0.612	0.779	0.419
Gunnison	14.460	0.698	0.102	0.515	0.786	0.484
Hinsdale	5.888	0.658	0.092	0.273	0.428	0.509
Huerfano	2.542	0.614	0.168	0.352	0.455	0.351
Jackson	1.676	0.747	0.148	0.257	0.369	0.375
Jefferson	2.420	0.710	0.553	0.647	0.625	0.379
Kiowa	1.755	0.764	0.168	0.276	0.449	0.312
Kit Carson	6.676	0.741	0.125	0.382	0.709	0.290
La Plata	10.010	0.632	0.151	0.642	0.705	0.526
Lake	5.463	0.585	0.101	0.179	0.585	0.535
Larimer	4.329	0.686	0.380	0.856	0.591	0.388
Las Animas	4.434	0.667	0.154	0.402	0.588	0.324
Lincoln	4.704	0.610	0.133	0.416	0.485	0.391
Logan	5.218	0.652	0.154	0.541	0.569	0.275
Mesa	10.071	0.659	0.169	0.729	0.615	0.582
Mineral	5.089	0.772	0.119	0.294	0.335	0.546
Moffat	7.379	0.650	0.125	0.406	0.612	0.460
Montezuma	8.637	0.713	0.134	0.488	0.550	0.506
Montrose	8.539	0.645	0.163	0.605	0.636	0.524
Morgan	2.492	0.655	0.234	0.474	0.541	0.230
Otero	5.376	0.627	0.133	0.373	0.506	0.468
Ouray	15.737	0.755	0.073	0.411	0.681	0.442
Park	8.188	0.767	0.171	0.511	0.708	0.436
Phillips	3.286	0.743	0.130	0.293	0.528	0.307
Pitkin	14.512	0.643	0.076	0.498	0.604	0.485
Prowers	2.250	0.718	0.229	0.308	0.582	0.306
Pueblo	4.690	0.612	0.199	0.631	0.516	0.337
Rio Blanco	4.625	0.526	0.127	0.323	0.530	0.495
Rio Grande	2.079	0.645	0.313	0.404	0.542	0.353
Routt	12.139	0.640	0.124	0.663	0.771	0.435
Saguache	6.258	0.655	0.109	0.415	0.461	0.419
San Juan	9.960	0.686	0.079	0.296	0.387	0.647
San Miguel	14.215	0.714	0.093	0.475	0.668	0.517
Sedgwick	2.380	0.794	0.126	0.249	0.478	0.316
Summit	11.825	0.705	0.126	0.561	0.764	0.453
Teller	6.861	0.663	0.168	0.505	0.650	0.452
Washington	1.819	0.657	0.264	0.334	0.545	0.313

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Weld	5.504	0.703	0.302	0.971	0.523	0.305
Yuma	4.707	0.619	0.162	0.447	0.649	0.312
Montana	**7.261**	**0.676**	**0.135**	**0.381**	**0.638**	**0.402**
Beaverhead	13.121	0.613	0.083	0.412	0.798	0.450
Big Horn	3.627	0.628	0.213	0.351	0.439	0.583
Blaine	5.237	0.585	0.132	0.380	0.539	0.450
Broadwater	9.538	0.722	0.091	0.323	0.626	0.451
Carbon	10.193	0.682	0.135	0.482	0.831	0.448
Carter	2.584	0.745	0.128	0.247	0.488	0.337
Cascade	10.850	0.695	0.120	0.648	0.602	0.391
Chouteau	8.263	0.773	0.140	0.399	0.809	0.343
Custer	7.608	0.719	0.132	0.383	0.820	0.311
Daniels	17.054	0.668	0.056	0.292	0.790	0.443
Dawson	6.029	0.697	0.130	0.352	0.741	0.296
Deer Lodge	7.240	0.604	0.080	0.233	0.516	0.541
Fallon	6.854	0.610	0.083	0.311	0.729	0.274
Fergus	6.782	0.653	0.129	0.407	0.767	0.307
Flathead	17.476	0.681	0.114	0.827	0.697	0.545
Gallatin	4.544	0.661	0.354	0.657	0.776	0.469
Garfield	1.114	0.711	0.375	0.271	0.540	0.327
Glacier	5.527	0.671	0.113	0.335	0.420	0.494
Golden Valley	-2.188	0.755	0.084	0.216	0.249	0.281
Granite	12.836	0.684	0.060	0.321	0.560	0.476
Hill	5.675	0.696	0.114	0.330	0.683	0.288
Jefferson	12.768	0.647	0.093	0.523	0.756	0.387
Judith Basin	3.355	0.614	0.129	0.240	0.565	0.388
Lake	10.369	0.704	0.116	0.481	0.590	0.515
Lewis and Clark	8.309	0.519	0.133	0.591	0.725	0.458
Liberty	3.548	0.576	0.073	0.271	0.503	0.299
Lincoln	15.805	0.686	0.078	0.507	0.645	0.478
Madison	9.159	0.593	0.126	0.485	0.690	0.525
McCone	2.899	0.470	0.215	0.310	0.833	0.351
Meagher	3.488	0.590	0.101	0.289	0.390	0.432
Mineral	11.915	0.828	0.108	0.297	0.589	0.654
Missoula	11.079	0.632	0.114	0.616	0.642	0.442
Musselshell	2.098	0.589	0.136	0.224	0.586	0.299
Park	7.051	0.696	0.151	0.420	0.756	0.375
Petroleum	0.730	0.937	0.311	0.177	0.354	0.437
Phillips	5.272	0.589	0.190	0.369	0.735	0.516
Pondera	7.994	0.797	0.098	0.319	0.576	0.409

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Powder River	4.390	0.709	0.123	0.270	0.622	0.332
Powell	8.571	0.665	0.086	0.276	0.622	0.468
Prairie	1.788	0.829	0.206	0.206	0.510	0.363
Ravalli	15.261	0.671	0.074	0.488	0.600	0.493
Richland	6.808	0.713	0.106	0.383	0.600	0.331
Roosevelt	7.104	0.643	0.153	0.455	0.514	0.595
Rosebud	4.977	0.684	0.163	0.500	0.558	0.308
Sanders	12.309	0.648	0.103	0.542	0.691	0.473
Sheridan	8.163	0.776	0.121	0.290	0.867	0.323
Silver Bow	9.403	0.593	0.079	0.348	0.682	0.401
Stillwater	5.569	0.721	0.154	0.419	0.634	0.337
Sweet Grass	6.610	0.774	0.125	0.315	0.723	0.330
Teton	12.979	0.766	0.106	0.386	0.865	0.432
Toole	11.510	0.575	0.048	0.299	0.773	0.263
Treasure	0.578	0.752	0.093	0.232	0.405	0.267
Valley	5.150	0.688	0.266	0.450	0.912	0.407
Wheatland	3.603	0.657	0.109	0.268	0.574	0.308
Wibaux	1.488	0.661	0.168	0.197	0.573	0.296
Yellowstone	4.539	0.631	0.254	0.696	0.635	0.294
North Dakota	**6.297**	**0.704**	**0.150**	**0.374**	**0.662**	**0.354**
Adams	3.390	0.692	0.183	0.311	0.743	0.248
Barnes	8.808	0.744	0.121	0.445	0.711	0.345
Benson	3.761	0.714	0.223	0.408	0.484	0.461
Billings	3.551	0.704	0.171	0.256	0.470	0.511
Bottineau	8.025	0.636	0.121	0.391	0.743	0.417
Bowman	11.045	0.773	0.107	0.327	0.990	0.291
Burke	4.497	0.679	0.108	0.307	0.637	0.262
Burleigh	2.759	0.632	0.361	0.530	0.727	0.300
Cass	5.270	0.676	0.268	0.707	0.623	0.400
Cavalier	10.329	0.718	0.122	0.363	0.867	0.442
Dickey	6.871	0.665	0.123	0.363	0.716	0.367
Divide	6.620	0.509	0.082	0.330	0.814	0.238
Dunn	7.432	0.854	0.139	0.304	0.771	0.358
Eddy	3.112	0.655	0.103	0.216	0.496	0.382
Emmons	7.810	0.715	0.117	0.348	0.843	0.282
Foster	4.951	0.665	0.154	0.303	0.674	0.413
Golden Valley	5.864	0.726	0.095	0.251	0.568	0.400
Grand Forks	4.824	0.687	0.210	0.525	0.581	0.379
Grant	1.695	0.792	0.184	0.276	0.496	0.277
Griggs	3.420	0.773	0.157	0.304	0.620	0.271

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Hettinger	5.211	0.799	0.122	0.279	0.719	0.261
Kidder	2.434	0.674	0.197	0.301	0.641	0.265
LaMoure	7.631	0.750	0.116	0.405	0.655	0.333
Logan	4.278	0.869	0.163	0.308	0.695	0.250
McHenry	10.658	0.777	0.092	0.405	0.681	0.343
McIntosh	7.004	0.768	0.113	0.318	0.736	0.300
McKenzie	8.078	0.740	0.139	0.418	0.671	0.443
McLean	12.784	0.736	0.115	0.510	0.843	0.399
Mercer	7.241	0.645	0.125	0.487	0.676	0.314
Morton	4.452	0.723	0.270	0.585	0.757	0.252
Mountrail	5.548	0.666	0.138	0.412	0.575	0.376
Nelson	5.221	0.769	0.209	0.384	0.735	0.386
Oliver	2.851	0.777	0.107	0.279	0.490	0.279
Pembina	14.560	0.741	0.110	0.483	0.900	0.445
Pierce	6.007	0.676	0.087	0.257	0.657	0.323
Ramsey	6.282	0.669	0.174	0.344	0.873	0.408
Ransom	5.189	0.729	0.168	0.335	0.767	0.324
Renville	2.631	0.645	0.170	0.266	0.609	0.321
Richland	5.391	0.502	0.139	0.469	0.689	0.360
Rolette	10.493	0.660	0.090	0.376	0.646	0.472
Sargent	2.723	0.725	0.303	0.330	0.729	0.336
Sheridan	1.439	0.717	0.105	0.225	0.371	0.359
Sioux	0.750	0.757	0.261	0.276	0.065	0.567
Slope	1.008	0.691	0.172	0.183	0.378	0.415
Stark	9.522	0.626	0.100	0.510	0.742	0.289
Steele	0.736	0.582	0.305	0.296	0.381	0.345
Stutsman	10.604	0.667	0.100	0.496	0.723	0.345
Towner	7.883	0.701	0.093	0.339	0.618	0.377
Traill	8.261	0.776	0.135	0.387	0.744	0.383
Walsh	10.240	0.726	0.102	0.416	0.709	0.383
Ward	13.230	0.652	0.093	0.631	0.656	0.373
Wells	9.729	0.713	0.092	0.345	0.727	0.371
Williams	9.614	0.645	0.098	0.520	0.665	0.313
South Dakota	**5.682**	**0.703**	**0.142**	**0.314**	**0.608**	**0.377**
Aurora	6.860	0.724	0.090	0.252	0.824	0.229
Beadle	4.584	0.632	0.145	0.360	0.753	0.248
Bennett	2.133	0.557	0.151	0.212	0.330	0.555
Bon Homme	10.296	0.759	0.097	0.341	0.776	0.358
Brookings	8.765	0.613	0.103	0.463	0.634	0.403
Brown	7.951	0.746	0.143	0.462	0.819	0.278

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Brule	5.575	0.730	0.144	0.267	0.767	0.358
Buffalo	-1.278	0.766	0.120	0.248	0.011	0.454
Butte	3.198	0.675	0.160	0.270	0.625	0.330
Campbell	-1.077	0.674	0.078	0.204	0.306	0.297
Charles Mix	7.444	0.739	0.129	0.383	0.574	0.466
Clark	7.588	0.802	0.089	0.246	0.640	0.377
Clay	6.398	0.630	0.067	0.325	0.508	0.333
Codington	12.077	0.732	0.086	0.380	0.739	0.387
Corson	2.178	0.737	0.162	0.287	0.135	0.590
Custer	5.075	0.598	0.198	0.395	0.713	0.497
Davison	4.673	0.622	0.155	0.365	0.772	0.275
Day	17.070	0.776	0.079	0.333	0.886	0.456
Deuel	15.918	0.807	0.055	0.335	0.636	0.382
Dewey	2.902	0.594	0.178	0.311	0.326	0.569
Douglas	3.224	0.782	0.176	0.272	0.711	0.246
Edmunds	9.820	0.649	0.088	0.332	0.849	0.319
Fall River	3.314	0.642	0.199	0.270	0.648	0.419
Faulk	5.685	0.741	0.080	0.226	0.611	0.329
Grant	14.782	0.756	0.086	0.372	0.793	0.460
Gregory	3.235	0.772	0.151	0.258	0.588	0.322
Haakon	1.770	0.603	0.275	0.254	0.721	0.290
Hamlin	12.392	0.691	0.061	0.331	0.696	0.341
Hand	4.960	0.725	0.117	0.238	0.674	0.341
Hanson	5.115	0.858	0.089	0.291	0.462	0.344
Harding	1.408	0.610	0.212	0.234	0.519	0.345
Hughes	10.621	0.754	0.120	0.394	0.855	0.391
Hutchinson	5.296	0.686	0.156	0.355	0.756	0.314
Hyde	2.385	0.671	0.076	0.223	0.511	0.273
Jackson	1.875	0.667	0.229	0.281	0.384	0.464
Jerauld	1.664	0.703	0.221	0.226	0.593	0.308
Jones	3.866	0.760	0.113	0.255	0.612	0.282
Kingsbury	7.736	0.753	0.144	0.334	0.840	0.381
Lake	8.827	0.623	0.089	0.315	0.701	0.427
Lawrence	4.237	0.665	0.256	0.431	0.639	0.498
Lincoln	4.209	0.677	0.252	0.491	0.691	0.366
Lyman	3.852	0.770	0.153	0.338	0.488	0.369
Marshall	4.970	0.767	0.159	0.302	0.549	0.468
McCook	6.654	0.750	0.158	0.356	0.830	0.334
McPherson	3.915	0.777	0.092	0.257	0.421	0.387
Meade	4.353	0.652	0.212	0.443	0.732	0.323
Mellette	0.276	0.494	0.189	0.226	0.300	0.373

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Miner	2.501	0.612	0.077	0.249	0.528	0.250
Minnehaha	3.177	0.655	0.324	0.597	0.647	0.289
Moody	12.228	0.847	0.076	0.269	0.618	0.474
Oglala Lakota	2.567	0.581	0.153	0.394	0.131	0.557
Pennington	4.935	0.648	0.264	0.649	0.649	0.410
Perkins	2.156	0.801	0.208	0.178	0.741	0.257
Potter	0.795	0.728	0.081	0.069	0.617	0.282
Roberts	20.901	0.830	0.084	0.380	0.784	0.638
Sanborn	0.296	0.652	0.140	0.200	0.415	0.291
Spink	9.850	0.722	0.086	0.339	0.754	0.320
Stanley	6.205	0.818	0.137	0.303	0.691	0.355
Sully	4.497	0.615	0.094	0.216	0.654	0.337
Todd	3.055	0.582	0.142	0.336	0.173	0.613
Tripp	2.502	0.648	0.150	0.241	0.633	0.282
Turner	6.513	0.799	0.185	0.345	0.841	0.381
Union	8.561	0.703	0.110	0.427	0.634	0.392
Walworth	7.781	0.672	0.087	0.240	0.777	0.340
Yankton	6.984	0.730	0.133	0.319	0.771	0.368
Ziebach	0.753	0.828	0.231	0.261	0.134	0.508
Utah	**7.259**	**0.670**	**0.211**	**0.495**	**0.617**	**0.463**
Beaver	10.117	0.727	0.135	0.552	0.590	0.507
Box Elder	7.366	0.755	0.167	0.599	0.635	0.319
Cache	4.753	0.664	0.267	0.541	0.638	0.494
Carbon	6.668	0.584	0.120	0.438	0.564	0.444
Daggett	6.685	0.761	0.128	0.311	0.404	0.610
Davis	1.357	0.639	0.711	0.424	0.655	0.445
Duchesne	14.008	0.761	0.075	0.423	0.589	0.449
Emery	9.925	0.631	0.125	0.540	0.663	0.495
Garfield	7.351	0.657	0.146	0.493	0.615	0.454
Grand	5.433	0.523	0.147	0.372	0.606	0.547
Iron	8.863	0.631	0.136	0.610	0.592	0.457
Juab	8.609	0.780	0.148	0.436	0.783	0.380
Kane	9.396	0.620	0.107	0.412	0.688	0.479
Millard	11.180	0.698	0.112	0.576	0.578	0.455
Morgan	6.623	0.673	0.155	0.462	0.701	0.371
Piute	6.188	0.678	0.103	0.252	0.399	0.605
Rich	6.337	0.541	0.110	0.393	0.604	0.427
Salt Lake	1.573	0.667	0.775	0.768	0.612	0.236
San Juan	8.578	0.642	0.127	0.481	0.617	0.492
Sanpete	8.578	0.712	0.137	0.446	0.681	0.460

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Sevier	9.782	0.729	0.134	0.463	0.683	0.496
Summit	7.613	0.671	0.156	0.570	0.606	0.429
Tooele	6.933	0.595	0.141	0.615	0.565	0.365
Uintah	12.073	0.741	0.117	0.518	0.601	0.546
Utah	3.145	0.678	0.462	0.706	0.591	0.446
Wasatch	7.740	0.587	0.147	0.513	0.637	0.539
Washington	6.026	0.701	0.266	0.612	0.619	0.585
Wayne	5.941	0.711	0.204	0.367	0.750	0.511
Weber	1.680	0.669	0.569	0.459	0.630	0.393
Wyoming	**8.236**	**0.659**	**0.142**	**0.464**	**0.658**	**0.433**
Albany	7.714	0.625	0.110	0.545	0.502	0.372
Big Horn	7.683	0.770	0.115	0.313	0.681	0.394
Campbell	5.632	0.675	0.227	0.683	0.634	0.335
Carbon	16.706	0.676	0.094	0.626	0.685	0.533
Converse	10.506	0.639	0.101	0.516	0.677	0.389
Crook	3.565	0.616	0.201	0.376	0.709	0.311
Fremont	9.572	0.670	0.132	0.589	0.602	0.464
Goshen	4.186	0.630	0.119	0.366	0.621	0.242
Hot Springs	3.438	0.668	0.189	0.218	0.622	0.476
Johnson	7.968	0.654	0.143	0.395	0.873	0.395
Laramie	4.868	0.619	0.171	0.566	0.599	0.268
Lincoln	10.437	0.685	0.155	0.573	0.755	0.549
Natrona	9.356	0.613	0.129	0.566	0.639	0.489
Niobrara	1.165	0.689	0.257	0.250	0.505	0.316
Park	10.395	0.676	0.145	0.557	0.717	0.542
Platte	6.378	0.600	0.123	0.409	0.658	0.375
Sheridan	8.432	0.576	0.125	0.468	0.706	0.484
Sublette	8.421	0.596	0.153	0.499	0.705	0.590
Sweetwater	12.194	0.666	0.107	0.573	0.602	0.505
Teton	10.915	0.719	0.154	0.573	0.721	0.567
Uinta	16.507	0.678	0.063	0.472	0.586	0.458
Washakie	9.653	0.682	0.099	0.260	0.725	0.520
Weston	3.737	0.743	0.168	0.268	0.610	0.378

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 9	**5.524**	**0.551**	**0.235**	**0.620**	**0.480**	**0.469**
Arizona	**7.359**	**0.613**	**0.183**	**0.710**	**0.710**	**0.410**

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Apache	10.466	0.650	0.125	0.741	0.443	0.473
Cochise	8.158	0.586	0.123	0.726	0.470	0.348
Coconino	13.333	0.650	0.132	0.906	0.573	0.472
Gila	7.544	0.556	0.112	0.528	0.495	0.463
Graham	7.635	0.625	0.108	0.427	0.540	0.457
Greenlee	6.192	0.572	0.130	0.378	0.481	0.590
La Paz	3.008	0.549	0.187	0.547	0.363	0.346
Maricopa	2.111	0.660	0.662	0.942	0.471	0.276
Mohave	8.288	0.632	0.122	0.830	0.365	0.275
Navajo	11.310	0.602	0.131	0.804	0.513	0.534
Pima	7.001	0.649	0.225	0.895	0.454	0.465
Pinal	4.616	0.594	0.249	0.873	0.389	0.343
Santa Cruz	5.316	0.640	0.123	0.420	0.399	0.456
Yavapai	9.728	0.612	0.131	0.896	0.504	0.286
Yuma	5.677	0.610	0.179	0.731	0.415	0.368
California	**3.897**	**0.498**	**0.279**	**0.641**	**0.485**	**0.461**
Alameda	1.436	0.394	0.501	0.720	0.549	0.338
Alpine	2.560	0.749	0.318	0.370	0.276	0.633
Amador	2.698	0.523	0.191	0.427	0.489	0.360
Butte	3.938	0.484	0.211	0.721	0.397	0.414
Calaveras	4.227	0.464	0.131	0.494	0.553	0.320
Colusa	2.453	0.482	0.147	0.390	0.359	0.410
Contra Costa	1.175	0.403	0.651	0.734	0.525	0.371
Del Norte	3.443	0.521	0.191	0.407	0.374	0.586
El Dorado	4.823	0.557	0.209	0.623	0.538	0.444
Fresno	5.014	0.470	0.241	0.960	0.478	0.435
Glenn	3.272	0.552	0.149	0.367	0.379	0.471
Humboldt	8.059	0.462	0.148	0.805	0.511	0.580
Imperial	9.285	0.654	0.155	0.894	0.379	0.438
Inyo	5.004	0.571	0.253	0.605	0.668	0.525
Kern	4.615	0.433	0.213	0.990	0.389	0.350
Kings	2.265	0.580	0.201	0.632	0.345	0.172
Lake	1.676	0.195	0.160	0.490	0.360	0.552
Lassen	11.003	0.632	0.117	0.630	0.529	0.535
Los Angeles	1.936	0.486	0.576	0.881	0.535	0.363
Madera	4.165	0.437	0.182	0.695	0.451	0.403
Marin	5.032	0.447	0.159	0.414	0.545	0.656
Mariposa	1.296	0.229	0.272	0.476	0.515	0.512
Mendocino	6.181	0.466	0.157	0.723	0.533	0.452
Merced	2.967	0.583	0.250	0.688	0.362	0.296

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Modoc	4.731	0.534	0.139	0.435	0.434	0.498
Mono	12.921	0.525	0.089	0.586	0.644	0.553
Monterey	2.231	0.175	0.187	0.809	0.493	0.513
Napa	1.240	0.307	0.370	0.458	0.518	0.512
Nevada	5.594	0.573	0.198	0.596	0.536	0.525
Orange	1.317	0.543	0.763	0.736	0.570	0.312
Placer	2.994	0.618	0.424	0.711	0.575	0.418
Plumas	3.901	0.539	0.291	0.635	0.527	0.561
Riverside	3.496	0.591	0.453	0.934	0.488	0.500
Sacramento	1.907	0.568	0.626	0.763	0.590	0.370
San Benito	4.763	0.583	0.124	0.427	0.453	0.402
San Bernandino	7.519	0.589	0.215	0.985	0.480	0.479
San Diego	3.767	0.542	0.386	0.907	0.520	0.507
San Francisco	5.591	0.792	0.240	0.429	0.530	0.614
San Joaquin	1.624	0.590	0.564	0.724	0.447	0.304
San Luis Obispo	2.721	0.452	0.439	0.861	0.606	0.471
San Mateo	3.954	0.423	0.186	0.557	0.539	0.485
Santa Barbara	7.179	0.556	0.224	0.830	0.559	0.645
Santa Clara	2.166	0.406	0.363	0.682	0.552	0.420
Santa Cruz	4.203	0.454	0.173	0.382	0.532	0.625
Shasta	6.492	0.416	0.134	0.799	0.462	0.429
Sierra	4.434	0.556	0.157	0.366	0.406	0.600
Siskiyou	2.107	0.395	0.398	0.740	0.541	0.440
Solano	1.509	0.433	0.455	0.607	0.522	0.383
Sonoma	3.670	0.381	0.251	0.783	0.564	0.497
Stanislaus	1.623	0.503	0.477	0.717	0.432	0.317
Sutter	2.546	0.571	0.192	0.470	0.437	0.303
Tehama	2.773	0.560	0.299	0.550	0.406	0.495
Trinity	2.548	0.489	0.271	0.428	0.405	0.600
Tulare	4.284	0.351	0.186	0.895	0.440	0.415
Tuolumne	3.730	0.417	0.171	0.570	0.476	0.438
Ventura	3.766	0.534	0.384	0.751	0.550	0.660
Yolo	2.664	0.538	0.317	0.564	0.514	0.429
Yuba	1.534	0.576	0.233	0.372	0.362	0.374
Hawaii	**16.531**	**0.739**	**0.092**	**0.570**	**0.589**	**0.479**
Hawaii	17.909	0.781	0.107	0.740	0.626	0.508
Honolulu	15.570	0.860	0.147	0.698	0.639	0.631
Kalawao	1.492	0.421	0.068	0.260	0.308	0.383
Kauai	20.062	0.789	0.074	0.559	0.733	0.383
Maui	27.620	0.846	0.063	0.595	0.640	0.492

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Nevada	**6.218**	**0.623**	**0.172**	**0.485**	**0.446**	**0.548**
Carson City	1.959	0.576	0.331	0.224	0.594	0.554
Churchill	10.613	0.717	0.116	0.544	0.519	0.505
Clark	5.389	0.631	0.316	0.901	0.458	0.569
Douglas	6.272	0.644	0.175	0.490	0.567	0.522
Elko	9.414	0.546	0.130	0.675	0.515	0.583
Esmeralda	1.220	0.579	0.101	0.282	0.010	0.586
Eureka	5.199	0.597	0.109	0.407	0.269	0.544
Humboldt	10.544	0.665	0.108	0.522	0.481	0.561
Lander	3.997	0.600	0.119	0.245	0.397	0.554
Lincoln	4.109	0.635	0.252	0.447	0.529	0.569
Lyon	5.634	0.712	0.207	0.527	0.434	0.562
Mineral	6.312	0.628	0.144	0.454	0.477	0.530
Nye	10.078	0.630	0.129	0.657	0.427	0.598
Pershing	3.517	0.567	0.154	0.389	0.321	0.524
Storey	1.695	0.688	0.266	0.309	0.498	0.347
Washoe	9.208	0.643	0.183	0.841	0.517	0.552
White Pine	10.550	0.528	0.082	0.333	0.575	0.658

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Region 10	**15.395**	**0.660**	**0.137**	**0.478**	**0.492**	**0.531**
Alaska	**57.225**	**0.736**	**0.038**	**0.475**	**0.479**	**0.627**
Aleutians East	122.319	0.762	0.012	0.342	0.305	0.990
Aleutians West	28.143	0.795	0.039	0.479	0.424	0.523
Anchorage Municipality	25.800	0.990	0.078	0.693	0.557	0.443
Bristol Bay	34.581	0.948	0.034	0.307	0.234	0.795
Denali	3.871	0.706	0.116	0.413	0.309	0.377
Dillingham	41.835	0.649	0.022	0.489	0.428	0.508
Fairbanks North Star	31.851	0.778	0.050	0.665	0.579	0.455
Haines	65.906	0.779	0.021	0.371	0.596	0.664
Hoonah-Angoon	66.480	0.638	0.010	0.416	0.357	0.502
Juneau City and	154.022	0.777	0.013	0.561	0.731	0.686
Kenai Peninsula	34.426	0.781	0.053	0.713	0.630	0.482
Ketchikan Gateway	145.556	0.743	0.010	0.464	0.617	0.614

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Kodiak Island	189.172	0.702	0.010	0.557	0.474	0.928
Lake and Peninsula	20.715	0.606	0.045	0.488	0.247	0.718
North Slope	51.674	0.638	0.038	0.747	0.365	0.959
Petersburg	39.241	0.762	0.026	0.318	0.604	0.538
Prince of Wales-Hyder	55.456	0.608	0.018	0.573	0.443	0.487
Sitka City and Skagway	45.338	0.767	0.036	0.398	0.681	0.709
Municipality	30.968	0.944	0.028	0.245	0.520	0.501
Valdez-Cordova	11.163	0.641	0.126	0.689	0.603	0.475
Wrangell City and	33.133	0.523	0.011	0.269	0.373	0.520
Yakutat City and	27.305	0.662	0.044	0.256	0.449	0.924
Idaho	**8.774**	**0.666**	**0.137**	**0.420**	**0.545**	**0.537**
Ada	3.770	0.625	0.345	0.562	0.580	0.586
Adams	12.908	0.720	0.093	0.376	0.573	0.627
Bannock	6.919	0.645	0.190	0.519	0.615	0.587
Bear Lake	3.113	0.269	0.102	0.284	0.632	0.480
Benewah	16.565	0.790	0.062	0.326	0.476	0.612
Bingham	7.274	0.595	0.146	0.492	0.626	0.507
Blaine	16.076	0.744	0.101	0.550	0.683	0.563
Boise	8.875	0.624	0.106	0.500	0.313	0.637
Bonner	20.557	0.616	0.064	0.636	0.582	0.531
Bonneville	4.295	0.623	0.282	0.574	0.647	0.465
Boundary	17.607	0.662	0.072	0.443	0.666	0.576
Butte	3.197	0.677	0.141	0.256	0.403	0.485
Camas	2.270	0.894	0.084	0.213	0.171	0.532
Canyon	1.917	0.651	0.431	0.507	0.518	0.366
Caribou	6.409	0.783	0.142	0.332	0.568	0.473
Cassia	11.750	0.660	0.101	0.452	0.644	0.542
Clark	0.944	0.766	0.313	0.243	0.254	0.503
Clearwater	8.102	0.623	0.144	0.417	0.609	0.637
Custer	7.015	0.659	0.173	0.419	0.592	0.636
Elmore	12.465	0.723	0.116	0.549	0.508	0.624
Franklin	6.364	0.616	0.130	0.411	0.529	0.493
Fremont	9.271	0.753	0.131	0.414	0.612	0.531
Gem	8.001	0.697	0.106	0.344	0.514	0.526
Gooding	8.570	0.552	0.102	0.424	0.566	0.542
Idaho	12.923	0.720	0.108	0.531	0.666	0.496
Jefferson	11.000	0.615	0.095	0.412	0.673	0.524
Jerome	7.811	0.667	0.133	0.514	0.485	0.504

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Kootenai	10.106	0.640	0.151	0.725	0.573	0.538
Latah	21.018	0.634	0.046	0.488	0.538	0.473
Lemhi	7.246	0.618	0.117	0.347	0.694	0.439
Lewis	6.810	0.857	0.177	0.285	0.458	0.710
Lincoln	5.931	0.623	0.151	0.270	0.536	0.676
Madison	6.932	0.799	0.157	0.430	0.542	0.469
Minidoka	8.853	0.659	0.093	0.333	0.487	0.571
Nez Perce	12.597	0.689	0.105	0.480	0.612	0.582
Oneida	4.510	0.669	0.146	0.246	0.546	0.510
Owyhee	7.633	0.675	0.106	0.367	0.430	0.559
Payette	4.066	0.568	0.135	0.359	0.440	0.465
Power	5.356	0.610	0.115	0.349	0.476	0.465
Shoshone	6.408	0.718	0.085	0.261	0.490	0.449
Teton	9.913	0.782	0.124	0.427	0.622	0.492
Twin Falls	8.948	0.562	0.125	0.592	0.599	0.501
Valley	17.870	0.652	0.088	0.506	0.812	0.602
Washington	5.882	0.568	0.101	0.321	0.434	0.542
Oregon	**7.145**	**0.618**	**0.149**	**0.499**	**0.465**	**0.517**
Baker	11.961	0.600	0.089	0.475	0.554	0.580
Benton	5.144	0.669	0.176	0.468	0.432	0.511
Clackamas	7.105	0.576	0.189	0.698	0.562	0.554
Clatsop	6.299	0.604	0.098	0.412	0.461	0.415
Columbia	3.875	0.686	0.167	0.400	0.408	0.438
Coos	5.082	0.511	0.124	0.509	0.411	0.433
Crook	6.593	0.622	0.130	0.416	0.517	0.509
Curry	2.809	0.568	0.253	0.353	0.489	0.550
Deschutes	13.496	0.745	0.123	0.661	0.561	0.553
Douglas	6.993	0.515	0.163	0.837	0.429	0.461
Gilliam	6.547	0.690	0.066	0.287	0.370	0.461
Grant	11.587	0.814	0.108	0.372	0.521	0.616
Harney	8.136	0.584	0.100	0.373	0.489	0.584
Hood River	5.421	0.495	0.147	0.392	0.552	0.601
Jackson	7.281	0.559	0.159	0.727	0.428	0.526
Jefferson	6.224	0.618	0.125	0.485	0.391	0.487
Josephine	4.082	0.437	0.142	0.477	0.399	0.518
Klamath	8.713	0.588	0.121	0.703	0.435	0.435
Lake	6.540	0.591	0.117	0.431	0.437	0.524
Lane	8.488	0.648	0.180	0.871	0.485	0.440
Lincoln	5.446	0.601	0.138	0.470	0.421	0.477
Linn	6.444	0.556	0.167	0.646	0.486	0.510

Area	CRSI	Governance	Risk	Built Environment	Society	Natural Environment
Malheur	13.153	0.728	0.098	0.506	0.450	0.625
Marion	5.282	0.514	0.184	0.628	0.531	0.477
Morrow	5.703	0.644	0.099	0.428	0.396	0.390
Multnomah	2.196	0.545	0.419	0.559	0.476	0.514
Polk	5.243	0.647	0.161	0.440	0.467	0.492
Sherman	8.020	0.782	0.055	0.269	0.279	0.529
Tillamook	6.278	0.631	0.155	0.487	0.500	0.515
Umatilla	12.495	0.675	0.112	0.697	0.501	0.500
Union	12.628	0.686	0.096	0.468	0.552	0.586
Wallowa	10.140	0.658	0.120	0.322	0.698	0.659
Wasco	12.989	0.640	0.078	0.496	0.465	0.548
Washington	1.983	0.562	0.405	0.419	0.501	0.540
Wheeler	2.760	0.761	0.081	0.210	0.232	0.519
Yamhill	4.073	0.510	0.207	0.561	0.445	0.522
Washington	**6.883**	**0.648**	**0.182**	**0.524**	**0.465**	**0.485**
Adams	5.951	0.684	0.080	0.422	0.329	0.375
Asotin	13.269	0.635	0.054	0.332	0.475	0.533
Benton	6.182	0.567	0.170	0.613	0.477	0.521
Chelan	10.756	0.701	0.128	0.590	0.550	0.530
Clallam	10.133	0.584	0.085	0.508	0.514	0.451
Clark	1.590	0.550	0.447	0.460	0.478	0.458
Columbia	2.910	0.526	0.165	0.235	0.510	0.524
Cowlitz	6.855	0.655	0.120	0.501	0.412	0.450
Douglas	3.731	0.693	0.254	0.490	0.416	0.506
Ferry	6.396	0.691	0.122	0.338	0.351	0.626
Franklin	4.886	0.668	0.158	0.461	0.486	0.396
Garfield	3.381	0.646	0.101	0.226	0.397	0.466
Grant	8.958	0.657	0.155	0.699	0.458	0.551
Grays Harbor	9.313	0.616	0.096	0.597	0.400	0.436
Island	4.087	0.820	0.192	0.374	0.456	0.432
Jefferson	4.164	0.437	0.152	0.468	0.518	0.479
King	3.328	0.686	0.527	0.864	0.521	0.501
Kitsap	2.375	0.619	0.266	0.499	0.443	0.335
Kittitas	6.399	0.735	0.200	0.575	0.499	0.498
Klickitat	9.349	0.654	0.119	0.558	0.503	0.497
Lewis	7.340	0.641	0.144	0.613	0.451	0.460
Lincoln	9.452	0.687	0.114	0.524	0.624	0.385
Mason	7.566	0.563	0.101	0.499	0.406	0.500
Okanogan	8.339	0.665	0.138	0.609	0.503	0.454
Pacific	5.751	0.594	0.092	0.448	0.387	0.382

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Pend Oreille	13.128	0.697	0.081	0.447	0.430	0.603
Pierce	2.392	0.659	0.571	0.727	0.489	0.476
San Juan	15.937	0.716	0.095	0.432	0.638	0.694
Skagit	9.140	0.675	0.141	0.569	0.507	0.570
Skamania	6.999	0.668	0.124	0.391	0.406	0.593
Snohomish	6.181	0.634	0.263	0.722	0.541	0.641
Spokane	4.593	0.650	0.272	0.715	0.513	0.408
Stevens	10.228	0.659	0.108	0.581	0.500	0.466
Thurston	2.187	0.696	0.531	0.564	0.522	0.464
Wahkiakum	-0.727	0.595	0.179	0.153	0.202	0.396
Walla Walla	7.648	0.657	0.103	0.543	0.432	0.369
Whatcom	7.693	0.638	0.188	0.694	0.533	0.557
Whitman	12.743	0.677	0.086	0.703	0.402	0.391
Yakima	7.823	0.661	0.174	0.705	0.438	0.538

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